# The Builder.

VOL. XVI.—No. 809.


*Ventilation of Sewers.—The Drainage Question.*

VENTILATION, or otherwise the prevention of effluvia, as we have often said, is a very important point in the sewerage question. The Report to which we referred last week, as previously, is the result of a reference of the City Commissioners to their Engineer and their Medical Officer of Health, to consider the question of sewer ventilation generally. The report of the latter, which has yet to appear, it is expected will give the results of an extensive series of chemical investigations into the composition of sewage waters, and the gases in sewers; and if it should suggest use of any chemical agents, the question of the practical application of them will probably be dealt with in a supplementary report by the engineer,—who may effect more than he at present thinks, with the means already open to him.

The older sewers had no ventilating-shafts, other than the gullies, which of course had no traps. On the increased consumption of water, its discharge into cesspools became inconvenient; and by progressive stages, that and the whole of the sewage came to be ejected into sewers originally devised for the rain-water and street-drainage merely. The reception of house-sewage by the sewers, first interdicted, came to be enjoined. Thus, prior to the year 1830, complaints of effluvium from the gullies commenced; in 1834, a gully-trap was designed by the surveyor to the City Commissioners of the time, and was applied in the Pavement, Finsbury: in consequence of the great complaints in the Holborn and Finsbury division of sewers, traps shortly afterwards were applied there: in 1840, nine hundred of the gullies in the City had traps; and in 1848 all the gullies were so provided. But even when a small number were fixed, it was apparent that the sewers were becoming dangerous for workmen, as well as that the gases found vent by the drains, and through the closets, into houses. The ventilating-shafts connected with small iron gratings in the centres of the carriageways, were then adopted; and this system of ventilating and trapping extended from the City of London throughout England, and continued to be general till the recent attempts by other methods.

The subject of sewer ventilation has been very imperfectly understood, and amongst the unlearned we may place the Board of Health, and their followers, who having a compact to rate down architects and engineers, at all times and seasons, as obstructives, themselves fall into errors of serious character. Amongst the "Elementary Maxims for Town Drainage," 1852, issued by the Board, is this one:—"Make proper provision for the ventilation of all sewers and drains, in such manner that there may be a free current of air through them in the direction of the sewage-flow." At Croydon this idea was acted upon: no provision was made for ventilation at the higher levels of the sewers; but a furnace was kept burning at the outfall, with the view of aiding the exhaustion and consuming the gases. The result, however, during the action of the furnace, was that (though it was believed that all inlets had been securely trapped, and the system almost hermetically closed, excepting at the outlet) the draught was frequently up the sewer, and not down it: the sewers, in short, ventilated themselves by the closet-traps; and the disastrous results of this and other cognate events are well known. Far from finding any regular influence from the water-current, on the course of the air, Mr. Haywood by repeated experiments has found that the air-current can be in an opposite direction; and this, he says, is its natural tendency. The newspapers have been very ready to admit complaints of the escape of effluvium from sewers, but it is clear that had the remedy been applied as suggested by the writers, more serious evils would have resulted.

Accidents in sewers through defective ventilation, appear to have arisen chiefly by the explosion of coal gas. The escape of this gas from the pipes is, without reference to the sewers, an evil of serious character, affecting the health of the metropolis: some attention has been given to it, and much more will be required. We refer to it here, to say that the results can hardly be warded off, except by the use of sub-ways, themselves ventilated, so as to prevent the unequal pressure of earth, and to allow of the escape, should leakage take place; and that such sub-ways, at all events, allow of some means of treating chemically the sewage in the sewers without the difficulties now considered to be insurmountable, though, as we think, erroneously so. The gas just mentioned, or carburetted hydrogen, is supposed, however, to arise, at times, from decomposition of the sewage. Sulphuretted hydrogen, the chief gaseous product of putrid decomposition, is found in nearly all sewers, and more or less in combination with other gases; it is slightly inflammable, but serious accidents have rarely occurred from that circumstance. It has greater specific gravity than the air. Carbonic acid, uninflammable, is also deadly and heavier than the air; but it is not found in the present sewers, at least not generally.

The remedies proposed to obviate the necessity for a better method of ventilation, include improvement in the mode of constructing sewers and drains, and keeping the channels in a high condition of cleanliness; disinfection of fæcal and other matters before passing them into the sewers; disinfection with chemical agents applied in the sewers; neutralization of the emanations by chlorine or other gases, similarly applied; and a copious dilution with water. The mechanical means include the existing method of ventilation; the use of the rain-water pipes; the provision of pipes or tubes carried up the fronts of houses to the tops of the chimney-shafts; shafts or chimneys erected at suitable spots; use of the lamp columns and jets of gas; and furnaces and shafts specially erected, or the application of those in works and factories which may be the property of private individuals. The mechanical contrivances include the various pumps and fans for effecting *plenum* or *vacuum* ventilation, and the use of the steam jet. Mr. Gurney claims a special merit as attached to the combination of the furnace and steam jet, and in comparison with simple furnace ventilation: he has stated, we believe, that merely passing sewer-air through the fire would not decompose the effluvia, as generally supposed; and in the Report of the superintending engineer, on the successful ventilation of the Friar-street sewer, in 1849, "the practicability of depriving the gases of their noxious smell and character, as rapidly as they were drawn out, by passing the jet through a coke fire" (we quote from Mr. Haywood), was considered by Mr. Grant as proved. Mr. Haywood, however, does not think there is conclusive evidence as to this special merit; and in its absence, his "impression is that simple ventilation by furnace would be found the best and cheapest." Sufficient extractive power might, of course, be applied to the sewers by either method.

The late experiments did not satisfy the City engineer as to the easy application of such methods, any more than as to the special merit just referred to. Mr. Gurney's argument before the committee, we believe, will be correctly stated here;—that inasmuch as gas for illumination is pressed from works through an immense number of ramifications and orifices, so air may be drawn from similar points in a reverse direction,—the greater friction in the tubes of small diameter, which would seem unfavourable to the latter operation, being, in opposition to Mr. Stephenson, considered of no importance. Mr. Gurney, as we have before mentioned, seemed to accord with the view of the analogy between the ventilation of sewers and the ventilation of mines,—though a mine has but one inlet and outlet, whilst a system of sewerage has an immense number of inlets and unavoidable leakage. It is this last circumstance that occasions the difficulty. If the supply of air answering the demand could be brought through inlets lying near to the position of the extracting power, the distant portions of the system would of course remain unventilated. It would be necessary to provide a very large number of the furnaces or other appliances, or to maintain an exhausting current at a cost which would seem excessive, even considering the objects, as well as a current which would render it impossible to carry on requisite works within the sewers. The total of inlets to the drainage-channels in the City of London is estimated at the number 47,819, or at one opening or inlet to every 23·84 feet of channel. The uncertainty of the operation, considering imperfections of traps and valves, and occasional openings for repairs, is therefore evident. With these ideas of the difficulties in the way of sewer-ventilation, the opinions of Mr. Faraday accord.

Notwithstanding these discouraging arguments, our information as to the experiments at Carlisle shows us that the system of ventilation by chimneys and furnaces deserves to be further considered, with a view to dependence upon it, if not wholly, occasionally, or in part. If we are rightly informed, some, if not all of the four chimneys used at Carlisle as auxiliary to the general system designed, have not been erected for the purpose, but are attached to steam-engines or factories which are private property. Adoption of such a system exclusively, would involve several obvious questions of arrangement with owners, and as to modifications in chimneys themselves. We are told, however, that at Carlisle the exhaustion of a certain length of sewer is managed by one of the shafts without difficulty.

It should not be forgotten that the gases are not readily destroyed, but that they have a tendency to descend from great heights, and diffuse themselves over wide districts. This was admitted by the Metropolitan Sanitary Commission in 1847, and by the General Board of Health in 1850.

As to the proposition to use the lamp pillars, aided by jets of gas burning night and day, it is doubtful whether offensiveness would be materially destroyed by the flame; and thus, issue of sewer gas would take place at a level where injury to public health would be nearly as great as under the present system. It is doubtful whether the currents would be sufficiently strong; and we gather from the

statements, that the cost to the City alone would be 23,508*l.* per annum. As regards unaided natural ventilation, it does not seem that this could be relied on. The rain-water pipes, tubes for the special purpose attached to houses, and separate shafts at suitable localities, have been tried, — the first-mentioned in several cases; but no one method is certain in action. In two of the methods, the advantage seems doubtful just where prevention of effluvium is most needed, and the gases, as we can testify, and as was stated in evidence the other day, are as great an annoyance in the upper rooms of houses as they would be in the street. The shafts without furnaces do not, from causes of temperature, seem to be efficient just when they are most needed.

Therefore, while admitting that cases like that of Carlisle, where several of the methods mentioned are in operation, deserve further consideration; and also admitting that in London, use might be made of other expedients, as shafts in the towers of churches; we are brought back to the question whether the real evil must not be combated at its origin, and by means the efficiency of which is not controverted, though the method of mechanical application may have to be shown. To such means, or other than improved ventilation, important, as we believe, under any system of metropolitan main sewerage, we must give attention in another article.

## EARLY CHRISTIAN BUILDINGS AND THEIR DECORATIONS;

### ILLUSTRATED BY WILTON CHURCH, NEAR SALISBURY.*

I have been asked to give you some particulars of Wilton Church, and to explain what class of buildings this edifice illustrates,—what particular period in that continuous history which architecture has written. To do this I must rehearse briefly a portion of that history, and tell a twice-told tale to many who are here. I might fear, therefore, to be considered impertinent were it not known that on these occasions some are present who have not given attention to the subject previously; and to these, carrying out the popular character of an architectural and archæological congress, I venture to address myself. What I have to say, and much more, will be found in the pages of the late Thomas Hope† and Gally Knight,‡ and if our visit to-day should lead any who have hitherto disregarded the subject, to look to these authors, if no further, one of the objects of the Congress will be attained. They will see how important to the history of the world are the buildings which the peoples have left, how interesting is the story they tell.

The Greeks improved on the architecture of Egypt and Assyria, and the Romans borrowed and altered the architecture of the Greeks.

In Rome, prior to the time of Constantine, the first Christian emperor, there were buildings of a particular sort, known as *Basilicæ*, which, as their name shows, were connected with the sovereigns, or the kingly office of dispensing justice, which was the use chiefly made of them.

[The reader then described an ancient basilica, —the narthex, nave, bema, and absis.]

When churches were needed for the offices of the Christian religion, these buildings were found suitable, and were so appropriated; and were, further, followed as models when the erection of other churches was necessary. The single porch of the basilica was elaborated in time to a court, with colonnades, similar to the court or atrium, which preceded many of the heathen temples. The clergy sat in the absis; a portion of the nave was railed off for the singers, and became the choir or chancel; and the *ambones*, or pulpits, were formed in it. After the removal, in the fourth century, of the seat of empire by Constantine to Byzantium, afterwards called Constantinople, other basilicæ were erected. The style followed in their erection was Roman, but art in Rome at that time had declined, and other circumstances were in operation to render these Christian buildings different from the Classic temples. In times of danger, the early Christians had been compelled to resort to the catacombs of Rome for the celebration of their rites. Here the martyrs were buried, and the walls and ceilings were adorned with pictures, and with Christian emblems. In the erection of new basilicæ, this connection between places of worship and the burial of saintly persons was continued, and crypts were constructed to receive the bodies of holy personages. Some of the churches built received the form of catacombs, and others were erected over existing tombs.

*San Clemente*, originally erected, perhaps, in the fourth or fifth century, rebuilt 790, but with little departure from original, and so remaining, affords a specimen of a primitive church, including the atrium for the excluded class of penitents.

In later times, when the number of altars was increased, an additional apse was introduced at the end of each aisle; later still at east side of transept, &c.; and lastly came side chapels.

"It is not certain," says Gally Knight, "at what time, or by whom, the form of the basilica was so far altered as to impart to churches the symbolical shape of the cross. That this alteration was not adopted in the first instance, may be inferred from the fact mentioned by Cedrenus, that Justin II. [580], altered a church at Constantinople, into the shape of the cross. Had the alteration been made, in the first instance, in the churches which Constantine built at Rome, it would, in all probability, have been equally adopted in the first churches that were erected in the new capital." The alteration, whenever it was introduced, would be easily effected by throwing out additional wings, on either side of the basilica, near the upper end, or the form might have been obtained internally by the disposition of the columns at the end next the absis. The roofs were of timber, and with the large extent of flat wall surface, afforded a good field for coloured decoration. Formed though these buildings were in many cases of parts taken from earlier structures, with their long ranges of columns, wide flights of steps over the crypt, leading up to the table of communion, with, behind this, the bishop's throne, and seats for the clergy around the absis, a noble effect was produced.

In Constantinople, changes in the form of churches were soon made. Skill in the art of vaulting, which enabled them to cover in large areas with domes, led to the substitution of a square for the oblong, and thus came into use what is known as the Greek cross (a cross with arms of equal length), in opposition to the Latin cross, whereof one arm is much longer than any of the others.

[Santa Sophia, completed in 548 Justinian, and San Vitale 530, were described as examples of Byzantine architecture.]

The schism which took place between the Patriarch of Constantinople and the Pope, led the Byzantine artists to maintain their own way of building in opposition to that of the Latin church. In the eighth century, to prevent a return to idolatry, all sculptured images were condemned by the Greek Church, and disappeared from their sacred buildings. Numbers of Greek artists were driven abroad, and the very steps taken to prevent the use of certain styles of ornamentation led to their introduction in various parts of the world. The way to make an opinion spread is to persecute it.

The use of mosaic work, colours, and gilding was very general in Rome when taste in architecture was declining: and the Greeks of Byzantium, taking up the manufacture of mosaics, became so celebrated as to give their name to some varieties of it. They attained peculiar excellence in giving to glass a variety of hues, and applying it to the adornment of walls and ceilings. The prohibition of sculpture in relief rendered this the more valuable.

In the sixth century, Ravenna became the seat of government of the Greeks, and numerous buildings being erected there, under Justinian, the Byzantine style was first seen in Italy. There were great convulsions at this time, and at the end of the century the Lombards were rulers in Italy, and, adopting the Romanesque manner with some new features which they introduced, built churches in every direction, and gave to architecture a distinctive character which prevailed wherever the Latin Church ruled. San Michele at Lucca, and San Michele at Pavia, of the seventh and eighth centuries, are the earliest churches attributed to them. Charlemagne put an end to the rule of the Lombards in 774, but adopted and naturalized on this side of the Alps their style of building, modified by Byzantine artists, by whom, indeed, the Lombards themselves had been influenced. In the eleventh century Lombard architecture received a fresh impulse, and was exhibited especially at Pisa, in the group of well-known edifices there. What we call Saxon and Norman architecture are shoots from the same root, influenced in their course by local circumstances.

Returning to the Lombard buildings of Italy we find the plan is that of the Roman basilica, with the Latin cross; slender projections rise from the ground to the roof line, arcades or corbelled strings follow the line of the gable, the surfaces are enriched with coloured materials, and over the central doorway there is frequently a wheel-of-fortune window. There is much variety shown in the capitals of the columns; vaulting shafts were introduced, with a large amount of sculpture, including Christian symbols. It was in this sculpture that the Lombard energy was especially shown. In some instances it covered the buildings with figures,—animals, and men,—from top to bottom. Some of the sculpture from Scandinavia.

The early churches had no tower. The year 772 is given as the date of the first, built in Rome. Intended simply to carry the bells, the tower had no necessary connection with the church, and always stood by itself. In countries where the weather was more inclement, this may have been found inconvenient; at any rate, the belfry was soon made, beyond the Alps, to form part of the building. In the eleventh century, as I have already said, the Lombard style had made an advance; the pillars were more lofty, the carving was less redundant. Then, too, appeared a new feature in the shape of large projecting porches, sometimes in two stories, the roof supported by pillars, which often rested on the backs of lions, intended, it has been suggested, to represent the strength and vigilance of the church. Sometimes, later, the animals were from the arms of the state to which the building belonged.

Those who have been so good as to follow me will step without difficulty from Northern Italy to the church in which we are assembled, in Wilton, once the most important city in the county of Wilts. The old church at Wilton had fallen into a very bad condition, and it became necessary to rebuild it. It was proposed at first to pull down the old church (the photograph before you shows its present condition) and build on the same site a Gothic church of moderate size and pretensions; but instead of allowing the parish to be at any expense, the Hon. Sidney Herbert took upon himself the cost of a new church on a new site. It is supposed that on the spot chosen stood originally a church dedicated to St. Mary and St. Nicholas. At any rate, they found many bones, which were disposed of as I will presently mention. At one time, Mr. Herbert intended bringing to England the principal portions of an old Lombard church near Florence. But as there was some difficulty in getting possession and permission to ship the remains, Mr. Herbert determined to build a new church instead, and adopt the style of the building in question. Messrs. Wyatt and Brandon, his architects, fell into his views, and the church in which we are now assembled is the successful result.

The date of the west front of Santa Maria at Toscanella, one of the works which served as a type for Wilton Church, is supposed to be 1206. It is Lombard in style, but displays so many innovations as to lead to the impression that a northern architect influenced it. Nevertheless, there is the wheel-of-fortune window, with the four beasts of the Apocalypse, and the pillars of the central entrance rest on animals.

San Pietro at Toscanella has a west front of the same character,—pediment, wheel window with the evangelistic symbols, arcade beneath it, great central doorway, and smaller entrance on each side to the aisles. The date of this is supposed to be the first half of the eleventh century. The body of the church belongs to the middle of the seventh century, and is a studious imitation of Roman architecture.

These two fronts, then, afford the type which the architects of Wilton Church followed; but the result is by no means a slavish appropriation, and may be taken to embody the characteristics of Lombard churches of the eleventh and twelfth centuries, exhibiting the effects of Byzantine influences.

[The building was then described. The campanile is about 100 feet in heighth, and is detached, connected by open covered way.]

Against the south wall of the church, outside, is a sarcophagus on cantalivers, surmounted by a roof supported on columns. In this were deposited bones, found on the site when preparing the foundations for the new church, thus preserving the connection which used to exist between the early churches of this character and sepulchral memorials. On a plate beneath the

* Read by Mr. Godwin, at the Salisbury Congress of the British Archæological Association, elsewhere mentioned.

† "Historical Essay on Architecture."

‡ "The Ecclesiastical Architecture of Italy, from the Time of Constantine to the Fifteenth Century."

sarcophagus is the following inscription:—"*Intus reponuntur ossa ovæ hoc sacrosancto loco olim humata hujusce ecclesiæ renovatæ substructiones inter faciundas effossa sunt. Anno Domini Nostri* 1845."

Entering the church you will find the plan coincide with that of the early basilican churches, already mentioned.

Made to form part of the north doorway is an Elizabethan monument, dated 1626, to William Sharpe and his wife, which was brought from the old church, and affords an example of the ease with which the architecture of the Renaissance may be made to assimilate with that of the Lombards.

Notice the diaper of west screen, and the mode in which the parapet is made to run round the columns. In it appear the words—"All things come of thee, and of thine own have we given thee." The ceiling over chancel is decorated with symbols of the Evangelists, and "*Salus Mundi.*" The capital of the last column on the north side also has the evangelistic symbols. In another appears the crowned cross, with the sacred monogram. Amongst the Christian emblems these were the most common, together with the dove with the olive-branch, the scape-goat typical of the atonement, the fish, and the vine.

"A priest transfixing a dragon with a spear, represented the destruction of Paganism. Angels on one side of the portal and devils on the other, reminded the faithful as they entered of the joys of Paradise and the torments of Hell."*

Amongst the Pagan symbols, the one the most frequently introduced was the Zodiac, and sometimes the Sagittarius appears by himself as the representative of the Zodiac. A Syren is not unfrequent, and probably was meant as a warning against the enticements of the world. The zodiac will be seen on the soffit of the arch, next the apse.

The font is of varied marbles, and does not at first sight suggest to us ecclesiastical uses; even the adornment on the foot of it—the vine-stem and grapes in *niello*, on white marble,—tends to prevent this. In truth, however, as you know, the vine has been a Christian symbol from the earliest time,—a symbol of the labours in the vineyard of the faith, or of the assertion, "I am the Vine." The early Christians, as Hope pointed out, adopted the Pagan emblems and customs, giving to them different associations. The vine of Bacchus and the corn of Ceres served to suggest to those who held by the new faith the Last Supper of their heavenly Master.

Let us pass now to other decorations. Without referring to antique mosaics, it will suffice to speak of the three varieties of Christian mosaics which were employed between the fourth century and the thirteenth century, mainly the work, as we have already seen, of the Greeks of Constantinople. The art was taken from Rome to Byzantium, where the Greeks made it their own.

This *opus Grecanicum* was glass tesselation, used chiefly in church furniture, and of which there are many specimens in Wilton Church, especially in the pulpit, the apse, and the small twisted columns supporting marble balls. These mosaics originally formed a shrine or tomb in the Church of Santa Maria Maggiore, I believe, and were brought to this country from Rome by Sir W. Hamilton, having been removed from the church during some alterations there. They found their way to Strawberry-hill (that curious first step to the study of Mediæval art in England), and when the collection there was dispersed, came into the possession of Mr. Herbert. Some of the other twisted columns and the balls came, I am told, from Palermo. The balls afford an interesting set of specimens of Italian marbles. This *opus Græcum*, or *Grecanicum* as it has been called, consists in the insertion into grooves, cut in white marble to the depth of about half an inch, of coloured or gilded *smalto*, as the material is termed, in such combination as to compose geometrical patterns. You may see other specimens of it around the north doorway. These forms were combined with slabs of porphyry, serpentine, and other marbles. The work prevailed during several centuries, but was probably not practised earlier than the sixth. The Saracenic workmen improved on the forms used. There is a specimen of this glass tesselation, you will remember, in the shrine of Edward the Confessor, in Westminster Abbey, executed in 1270.

An earlier kind of glass mosaic is that called *Opus Musivum*, which was used for walls and vaults, and in which were produced many glorious decorations, including full-sized figures of the Saviour, the apostles, and martyrs. The pieces of glass used in this are of irregular shapes, and the ground tint is almost invariably gold. Of the third and last variety, the *Opus Alexandrinum*, which is of considerable antiquity, there is a small specimen from Italy in the entrance porch here, which, like all the Italian examples, is composed of the three materials—porphyry, serpentine, and a white or slightly coloured marble. In this work geometrical patterns are produced by the arrangement of small cubes. The Byzantine Greeks carried the manufacture of this to a great extent, even if they did not originate it. What is known as "Florentine mosaic" grew out of it in later times.* There is a large piece of the *Opus Alexandrinum* of modern workmanship at the foot of the steps leading to the chancel. This was made for Mr. Herbert, in Rome.

Some small additions to the old glass tesselation in the pulpit, in the shape of pilasters, &c. are noticeable as specimens of modern English work. The pavement in the chancel was made by Mr. Singer, who strove to imitate the ancient Roman *Opus Tesselatum*. To get the tesseræ of uniform size, good and permanent colour, and sufficient hardness, requires elaborate and ingenious arrangements. The pavement before us is in some respects very good, but the colour in parts has faded; a fact to make us admire the more the perfect condition and excellence of pavements say sixteen hundred years old, which are ever and anon exhumed, to remind us that the Romans were once in this country.

The modern monuments have much artistic excellence. The bust of Henry Earl of Pembroke, who died January 9, 1749, is inscribed "*Ung ge serveray.*" The tablet to Elizabeth Countess of Pembroke, March 25th, 1793, is by Rossi. The marble sarcophagus, in memory of another Earl of Pembroke, was executed by the late Sir R. Westmacott from the design of James Wyatt, the architect. The same sculptor executed the fine monument near it to the last earl, George Augustus Herbert, who died Oct. 26, 1827.

Let us now glance at the glass in the windows. The window on east side of north door is apparently Flemish, Cinque-Cento. There is a "pieta" at bottom of earlier date.. The second window from east end on same side, by Messrs. O'Connor, is inscribed to the memory of Jane Merriel Chermside, by her children, August, 1852,—"Sorrowing not as without hope." It includes groups—Raising of Lazarus, Widow's Son, and others. The window next to it eastward contains some old glass mixed up, including groups illustrative of the Life of the Saviour.

Some of the glass in the north apse is very fine. The date is various, from the thirteenth century upwards. The drawing of the female martyr holding her head in her hand (Ste. Regula) is good. The figure of a Bishop, on the south side of this apse, is also excellent: the Saviour, admirable.

The windows in the chancel apse, given by Lord Bruce, Lord Melbourne, and others, include some thirteenth-century glass of fine colour made up with modern glass. Each groups is within a *vesica piscis*,—Driving out the Money-changers, Flight into Egypt, and others.

There is some remarkable glass in the south apse: notice the head of the kneeling ecclesiastic; while in the vestry are some small subjects in circles of the sixteenth century.†

There is no doubt whatever of the use of coloured glass in windows as early as the sixth century, and every reason to believe that it was so in the fourth, if not earlier. Two verses of a description left by Prudentius, of *San Paolo-fuori-le-mura*, built by Constantine, are translated,—"In the rounded windows are displayed panes of glass of various colours; thus do the windows shine when decorated with the flowers of spring."‡ In these early times the windows were made simply of pieces of glass of various colours, arranged to form a design,—glass mosaics in fact. When the art of actually painting glass was first practised is a subject of controversy. Some of those who have looked into the evidence believe that it was unknown in the ninth century, and there are no examples known to which an earlier date than the eleventh can be assigned with certainty.

The painted glass of the twelfth and thirteenth centuries differs little, and of the glass of this latter period we have some good specimens in the church under consideration.

The glass of the thirteenth century often displays mosaic grounds, with small medallions of figures, symmetrically distributed, the whole surrounded by borders of conventional foliage and interlacings. The Old and New Testament, and the Lives of the Saints, give the subjects for the medallions. The colours are rich: there is rarely any white glass in picture windows, and what is principally sought is the harmonious effect of the whole as a portion of the building. The foliage is conventional: the figure drawing rude. In the glass of the succeeding centuries, skill in design and drawing having increased, the windows become more individual works, the figures are larger, one sometimes occupying a whole window, and are placed under more elaborate canopies. In this century, too, is seen for the first time the lemon-yellow stain. The foliage has a more natural form. In the windows of the fifteenth century, with even greater tendency to make a picture, we get rich hangings behind the figures, and in the latter part of it first see buildings and landscapes introduced. Much less use is made of pot-metal (glass coloured in the making), more white and light yellow glass is introduced, and the forms are produced by shading in colours. In later times glass came to be regarded simply as a material to be painted on; pictures by Raffaelle and others were copied upon it, and the ruin of the art followed,—not, however, without a brilliant period intervening. In modern times successful endeavours have been made to revive it.

It is to be hoped that we are gradually arriving at correct opinions in respect of painted glass, and that it will be treated more as an art and less as a manufacture than has been the case. The amount of bad glass, with much good also, that has been put up in England during the last twenty years is enormous. We want the best glass, the best colours, and the best drawing employed on right principles under artist minds, to produce windows, not pictures painted on glass, which shall be worthy of the age, awakeners of sentiment, and sources of delight.

The lecturer then alluded to the various carvings in the church, especially those in the west door inside; the old alms chest adorned with wrought iron-work; and a brass to John Coffer, gentleman, "servant to Sir William Herbert," 1585; and said:—

Without stint, and yet not wastefully, Mr. Sidney Herbert has thus employed various arts to perfect the structure due to his piety and munificence. Such works have a wide influence and effect much good. They quietly elevate the character of a neighbourhood, which reacts elsewhere. They tend to the improvement of the arts that refine, develop, and adorn, and serve as points of 'vantage whence others may proceed further. Man is not to live "by bread alone." The body must be cared for: but the heart and the mind also need cultivation and support.

---

* Gally Knight.

* Those who would study the subject should consult Mr. Digby Wyatt's "Geometrical Mosaic of the Middle Ages."

† Several portions of the glass in this church are figured in Mr. Winston's valuable "Inquiry into the Difference of Style observable in Ancient Glass Paintings."

‡ Quoted by Labarte.

## SOME REMARKS ON THE APPEARANCE OF STRAIGHT LINES IN WORKS OF ART.

A DESIRE to improve our architectural taste, or to discover the best mode of doing anything, is not only natural, but laudable: it is only when this desire is indulged to excess, that it becomes dangerous. In every age and community, some particular theory of taste, or peculiar idea of perfection in the Fine Arts, operates for a time on the public mind, to which all must, more or less, conform, who aspire to please, or hope to be received in good company. Never having seen a specimen of Greek Architecture, except in museums, it is not without considerable hesitation that I venture to offer a few sentiments upon this abstruse subject. I have carefully perused the various writings which bear upon it, especially that very learned volume, in which Mr. Penrose gives us the result of his investigation of the various delicate curves which form the principal lines of certain Greek buildings, erected during the most refined period: he states that "the amount of curvature is so exquisitely managed, that it is not perceptible to a spectator, or at least not until the eye has been educated by considerable study founded on knowledge of the fact." In another part of his work, he informs us that "in some Greek temples, although erected during the very best period of Greek art, the columns have no entasis whatever:" on the authority of Mr. Penrose, therefore, it appears pretty certain that Greek architects did not invariably bend long lines that were intended to appear straight.

In this country, thirty or forty years ago, when scarcely any but Grecian buildings were tolerated, it would have been deemed *barbarism* to have curved a line in a purely Greek edifice. At that

period, a celebrated architect gave his mason the drawings of a Doric portico, to be executed during his absence on the continent: no intimation was given that the columns were either to be "swelled" or straight, and they were consequently executed with a *very slight* entasis; so slight, that it was not observed by the architect when he returned, until he had inspected the work several times; but when discovered, it was pronounced to be vulgar, unarchitectural, and the sight even of anything so monstrous could not be endured; and notwithstanding the building was finished, the mason was obliged, at his own expense, to re-work the columns and their flutings, to make them perfectly straight from top to bottom.

As soon as Mr. Inwood had made out the necessary working drawings for the lower portion of St. Pancras Church, he left the work in charge of his two brothers, and proceeded to Athens, in order to ascertain many details of the Erectheum, more correctly than were given in Stuart's work, or to be found in the Elgin collection at the British Museum. When he returned the building had reached the height of the entablature, and, on the authority of Stuart, the Ionic antæ were made parallel and upright: that is, without either diminution or entasis. The architect having ascertained that this was not in accordance with the antique example, had the antæ all re-worked after they were fixed, to diminish the upper part, and give them the proper entasis.

The outer lines of a swelled column represent the frustrum of a parabolic or hyperbolic curve, which is amongst the most perfect of the geometric forms, and may be an improvement upon the straight-lined column; but in constructing a large obelisk, much consideration is required before we depart from the simple straight-lined form, under the idea of improvement. I am aware of the difficulty of overcoming prejudices in favour of long-established practice, in matters relating to art or science; nevertheless, optical effects are now well understood, although some of them may not be easily explained; and the rules of perspective are proved to be perfectly in accordance with nature, and founded upon the strictest mathematical principles: with such aid, we may arrive at far more satisfactory conclusions respecting the appearance of lines variously situated, than can be adduced from opinions founded on some preconceived notions of right or wrong, and which are generally problematic statements without proof.

In constructing an obelisk, is it advisable to make its outlines positively crooked, under the idea that they will then, and only then, appear straight? Or can an object that is decidedly right, true, and correct, under any circumstances look wrong, false, or incorrect? Is it not probable that our sense of vision may be deceptive; that we may receive impressions on the imagination that are not real, and such as may require very attentive consideration; or we may fall into erroneous conclusions. A line that is to represent straightness, or the shortest distance between two points, being intentionally curved, cannot, under any circumstances, represent to the eye correctly that which is intended. Whoever trusts unnecessarily to the accuracy of his eye, and sets positive rules of art at defiance, will, at all times, be liable to make great mistakes. Vision, optical effects, and especially the true principles of perspective, judiciously applied to works of art, tend invariably to perfection. To deviate from them, in ever so slight a degree, is to depart from truth; to pass by the substance and follow the shadow. It is like attempting to improve the multiplication table; or to depress or swell some portion of a circular object, with the view of making it look rounder.

By a similar mode of fallacious reasoning, a long architectural elevation, such as one side of a street, viewed from the opposite houses, ought to be made hollow on the top of the parapet, that is, a little higher at each end, without the least symptom of an angle, just opposite the observer, where it appears to be the highest part. As far as appearances are concerned, this apparent declination towards each end is not altogether fictitious, although, in some respects, it may be termed delusive, for if a straight ruler or string be held up, stretched between the two hands, so as to form a right line, the tops of the houses will exactly coincide with the edge of the ruler or tightened string. Thus, the string being held horizontally, or parallel to the tops of the houses, will affect the eye of the observer precisely in the same way; and the string itself will appear to bend downwards at the ends. This may be demonstrated with mathematical precision, by the doctrine of similar triangles. The same train of argument applies equally to a pilaster built with parallel and perpendicular sides; as we frequently find in Roman and revived classical works, which is generally considered to appear broader at the top than at the bottom. In this case the spectator allows his imagination (not his eye) to deceive him: the actual appearance (not the measurement) of the breadth of the pilaster at top is smaller than the bottom. Every portion of the pilaster upwards is seen within a smaller visual angle than an equal portion level with the eye; therefore the higher we look, the narrower will be its appearance, until ultimately the parallel lines will altogether disappear and vanish in the zenith, or point precisely over our heads.

Artists may possess much practical knowledge of perspective, and be capable of drawing very clever architectural subjects, either views from nature or imaginary designs, and yet be unacquainted with the true principles of the science. Such artists assert that the rules of perspective are not to be depended upon, and that if strictly followed they occasionally produce unnatural representations: as an instance, they adduce the case of a very high, straight-lined parallel tower, which will, unquestionably, appear in nature to diminish upwards, in every respect the same as a perpendicular pilaster: to represent this object, according to the rules of perspective, we have to make the tower as broad at top as at bottom, and this will be strictly correct. A photograph, if properly taken, would be the same; but if the photographic apparatus be left to one ignorant of the correct mode of placing the instrument, the lines, which are perfectly upright in the real object, will be represented in the photograph converging upwards or downwards; and such defects are ignorantly attributed to faults of the lens, or of the process generally. Upright lines in a building will all correspond with the plumb-line, whereas, if such lines are made to converge in a picture, they will not bear the test of the plumb-line; consequently, such a mode of representing the outlines of perpendicular edifices must be false, and unlike the real object.

C. H. Smith.

## NOTES ON THE ASSUMED USE OF CHESTNUT TIMBER IN THE CARPENTRY OF OLD BUILDINGS.*

The roof of St. Nicholas' Church, Great Yarmouth, is stated to be of chestnut. I had hoped to have been able to have ascertained this satisfactorily last year, whilst staying in that town, but having left the examination of the church until the last day of my stay, I found, when arrived in the belfry, that lights, as well as much courage, were wanting to grope amongst the old timbers, where shortly before a lad had stumbled and been precipitated through the boarded ceiling on to the floor of the church. Whilst there I obtained a piece of what all the local carpenters call chestnut: it formed part of a standard to a former gallery, put up in 1640. The grain is very peculiar; but it is oak, not chestnut, and closely resembles a panel I have seen labelled as "English oak."

Brandon, in his valuable work on "Timber Roofs of the Middle Ages," says, "they are all of oak or chestnut." The roof of Chartres Cathedral, burnt in 1836, was said to have been of oak chestnut.† In the description in the "Monasticon"‡ of Castel Hymel, of Fineshed Priory, in Northamptonshire, there is an improvement on the misunderstanding: "In the granary lately taken down, the beams were of *horse chestnut*."

Of another well-known structure, still said to be roofed with chestnut,§ it is reported "that the timber used for the scaffolding, &c. and for the upper roof of the chapel [of King's College], seems to have been given to the college by Henry VII. and his executors, over and above the 1,000*l.* before mentioned, for the college paid only for felling and carriage: it was brought from the Wethersfield-park, Poule-park, Walden-park, Ashden Halys, Bardefield-park, Broxstey-park, all which are in Essex, and some from Cartlyng (Catlige), in Cambridgeshire; the timber of the roofs, I believe, was chiefly from Wethersfield." If this be correct, Hales, before quoted, is wrong in stating that it was obtained from Ireland, and tradition is again worthless; but did the county of Essex ever grow chestnut trees for timber? I must regret that I have had no opportunity of inspecting the roof timbers of this chapel so as to satisfy myself.

Two pieces of wood called chestnut have been kindly forwarded by Mr. Rowe, taken out of old buildings at Cambridge, both of which I submit are oak; as well as another piece sent by him from an old house at King's Stanley, near Stroud, lately pulled down: it is a fine specimen of an oaken beam between 250 and 300 years old. Also another piece of a moulded beam, taken out of the principal gateway of Trinity College, Cambridge: it was situated in Sir Isaac Newton's study, being the first-floor room over the gateway. This is also oak.

Besides having been used for beams, it is stated,* that at the end of the sixteenth century *wainscot floors* were much in use, and in some manor houses, *chestnut floors*, as at Cotele, in Cornwall, an ancient house; and also at Mount Edgecumbe, in Devonshire.†

I will now submit some specimens of the actual woods under discussion. The first is a veneer of chestnut, as sold by the fancy wood-merchants. Mr. Ashpital kindly obtained for me specimens of oak and of chestnut, *both grown in the same wood*, in Kent, which suffice not only to show how close is the resemblance between the two woods when young, but also how the difference between them is to be observed. As these small pieces, however, could hardly be considered sufficient, I inquired for some larger specimen amongst the timber-yards of the metropolis, and when about giving up the search in despair, obtained a board, which, being 21 inches in width, will show the grain clearly. There are also some specimens to which I will refer presently.

How is chestnut, then, to be distinguished from oak, and is it at all serviceable as a timber?

One of the practical suggestions that has been made for the discovery of the difference is given in Nicholson's "Dictionary of Architecture," who states that it may be found by driving an iron pin or nail into the woods while fresh: in the oak a black stain will be produced, but not so in the chestnut. This observation is repeated in another work; and they are the only two in which I have seen it named. I tried the experiment with the two fresh pieces sent me by Mr. Ashpitel, and you will perceive that both of them have the stains: the two in the oak showed in two days, and of those in the chestnut, one showed in two, and the other in four days' time. Another suggestion is to weigh a portion of the wood in question. Dry chestnut, according to Tredgold, "weighs from 34 to 38 lbs. per cubic foot, whereas dry English oak weighs generally from about 50 to 55 lbs. One dry specimen from an old oak tree weighed 39 lbs. or about the same as chestnut." On weighing the piece of wood from King's Stanley, above mentioned, I found a cubic foot of it would weigh 53 lbs.

A third idea is rather more laughable than serious, and has already been adverted to: it is one, however, which, from its being "a wise saw," ought not to be neglected, especially as the "spiders" are so often put forward as better authorities than ourselves in the settlement of what is oak or chestnut. In addition to what has been said in the earlier portion of this paper, you will find several remarks under the heading of "Spiders and Irish Oak," in "Notes and Queries" for last year (p. 208, &c.) "thus, in 'Pointer's Oxoniensis Academia,' 1749, is the following, in his account of the curiosities of Christ Church College:—The roof of the aforesaid hall is remarkable on this account, that, tho' it be made of Irish oak, yet it harbours spiders, in contradiction to the vulgar saying. Tho' I am apt to think that there may be some pieces of English oak amongst the Irish; or else probably that particular smell that proceeds from that sort of oak, and is perhaps so distasteful to that sort of vermin, may be spent through age, or disguised by smoak, and so that common saying may stand good still." It is also shown, p. 293, that the spider "has *no dislike* to fixing its web on Irish oak;" also that "no spider will hang its web on the roof of Irish oak in the chapel or cloisters at Winchester;" and "chestnut is said to possess the same virtue. "The cloisters of New College, roofed with chestnut," are free from spiders; "the choir of St. David's Cathedral is stated to be roofed with Irish oak, and there are no cobwebs, although they are plentiful enough in other parts of the cathedral:" and lastly, that "a fine old roof at

* Read by Mr. W. Papworth, at Institute of Architects. See p. 497, *ante*.

† *Builder*, xi. p. 693.

‡ Vol. vi. Part I. p. 449.

§ Le Keux, "Memorials of Cambridge, ii, 43.

* Brown's "Domestic Architecture," p. 156.

† Since reading these "Notes," my friend, Mr. W. Damant, of Plymouth, accompanied by a gentleman well versed in the nature of timber, has kindly examined for me the presumed chestnut floors at Mount Edgecumbe. They pronounce them to be "of what at the time of laying was young oak—excepting that in two or three small window recesses, and in the margins to the hearths, chestnut had been employed. There were also two or three short pieces of chestnut in the floor of the drawing-room, but they appeared to have been used in repairs. The floor certainly was not chestnut, nor was that wood employed at all in the other joinery of the house."

Turner's-court, in the parish of Cold Ashton, Gloucestershire, four miles from Bath, is perfectly free from cobwebs, and is said to be of chestnut."

The qualities of chestnut wood, as required to be known to us, are thus admirably described by Selby, in his "History of British Forest Trees," 1842:—"The only particular in which the chestnut exhibits a decided inferiority (to the oak), is in the quality of its timber, which, unlike that of the oak, which gains strength and durability by age, begins to deteriorate at heart ere the tree has passed much beyond the first half century of its growth." "By some the chestnut has been considered as indigenous to England—the more general opinion, however, is that it is not a native, but was introduced at a very distant period, probably by the Romans. The belief which so long and so generally prevailed, and indeed, we may add, still partially exists, that the roofing and main beams of many of our ancient buildings and houses were framed of the chestnut, naturally gave rise to the idea that a tree so abundant and generally distributed as it must have been in former ages, must also have been of indigenous growth; for this supposed chestnut timber, we may remark, is not confined to buildings in the southern and midland districts of the kingdom, but is also found in the northern counties, and even in Scotland, for Sir T. Dick Lauder, apparently not aware of the discoveries of D'Aubenton and others, instances the roof of the Parliament house at Edinburgh as constructed of chestnut:" and in a note, "It is remarkable that the same belief of the use of chestnut-wood in ancient buildings also prevailed in France. Buffon, however, and afterwards D'Aubenton, showed that the timber taken for that of the chestnut was in fact that of quercus sessiliflora. The examination, however, and the repeated experiments of late years which have been made upon this wood, have satisfactorily proved that, in all such instances, the timber of the oak, and chiefly of the sessile fruited kind, have been mistaken for chestnut: and this fact, in a great measure, does away with any argument that might otherwise have been adduced in favour of the chestnut's indigenous origin, had the application of its timber in reality been as extensive as these ancient buildings seemed to indicate. It is also more in accordance with what we collect from the *earliest* of our arboricultural writers, viz.—that the chestnut in their time was by no means of common occurrence or widely distributed." "The fact is, as Buffon first observed, the wood of the oak, more particularly that of the sessile fruited variety, assumes in course of time a near resemblance in colour to that of the chestnut in its best condition, or when young and untainted at heart; and, as few chestnuts could have acquired the scantling frequently observed in the timbers of these ancient buildings at the age dialing or decay almost invariably commences; this in itself furnishes a strong argument against the use of chestnut timbers and beams by our ancestors, inasmuch as the trees must have *become unfit for the purpose* long before they had attained the necessary dimensions." "In appearance and colour, the wood bears a resemblance to that of the oak, but may always be distinguished by its want of the large laminæ (flash) or transverse fibres which are seen in the oak, particularly when cut perpendicularly on the outside, in the plane of these laminæ." For gate and other posts, railing, spars for building, piles, and various other purposes not requiring wood of large size, it is well adapted, and perhaps as durable as and other timber we possess."

Sir H. Davy* also says, "It may easily be known by its want of the laminæ, as also from the pores in the alburnum of the oak being much larger and more thickly set than those in the chestnut, which cannot be distinctly seen without the aid of glasses."

The difference between the woods of the two oaks commonly seen in England, is that the grain of the wood of quercus sessiliflora is generally less varied and of a more uniform and deeper colour than that of quercus pedunculata, and with less of that laminated appearance which is called the flash or silver grain. The trees are said to be known by the sessiliflora having the acorn stalks short or seated, with the leaves long; while the pedunculata is the reverse, having the acorn stalks long and the leaves short. The acorns of the former grow in clusters of two or three close to the stem of the branch: those of the latter grow singly, or seldom two on the same footstalk. The quercus pedunculata, or robur, as it is more generally called, is the true old English oak, the sessiliflora being supposed to have been introduced some two or three ages ago from the continent. There appears to be much diversity of opinion among botanists and planters on the value of the timbers of these two oaks, to the same extent at least as that already shown to have existed on the use of chestnut; and some authors deny the botanical difference of the trees.

Chesnut timber has been often urged as a material for ship-building. One apparently qualified writer, Monteath, says,* "Notwithstanding the excellent quality of the Spanish chestnut timber, which is equal to the oak in ship-building, and also for any machinery, yet it has not been generally used; but this tree should be both more planted and more used as timber." Also, "Spanish chestnut is used by cabinet-makers for boxing, at 2s. 6d. per foot, though it is of much more value when suitable for ship-building, as it is often used for that purpose." While Matthews, in a much commended work on Naval Timber (1831), says, "There is one circumstance connected with this timber in this country, at least in Scotland, which must prevent its general use in shipplank, and be of material injury to it for ship timbers; this is, that few trees of it of size are found without the timber being shaky or split, some to such a degree that the annual rings or concentric growths have separated from each other." "From the use of the Spanish chestnut in the Spanish navy, both in planking and timbering, and from the roofing-beams and ornamental work of Westminster Hall being also of this wood, we should suppose it was not so liable to this defect of rents in the timber in milder climates. It is, we should think, as capable of supporting weight, when stretched as a beam, as the oak. Having much less proportion of sap-wood, and from the matured wood containing much less sap or moisture, we should suppose it not so liable to dry-rot, or that more simple means, or a shorter period, would suffice for seasoning it, so as to be proof against this evil." According to Belidor, chestnut soon rots when built in a wall, therefore the ends of joists of this wood should have a free space left around them.†

In the 10th volume of the Transactions of the Society of Arts,‡ the writer urges that "for most purposes except shipbuilding, chestnut will be found equal to oak; and in buildings and outdoor work, much superior. In 1726 a piece 13 inches square was used as a hanging-post to a gate, and being found, after fifty-two years' use, perfectly sound, was again put down for a clapping-post. In 1743 a large barn was built with some of this timber, and is now sound in every part, as well as several chestnut posts and rails, after standing thirty or forty years. And a fencing made of oak and chestnut posts, being removed after twenty years' standing, the chestnut was found perfect, while the oak posts could not be used again without a spur to support them. The writer accounts for Evelyn's assertion of the decaying nature of chestnut, by stating that it is the case with old chestnut, that has been suffered to stand beyond the time of its attaining its full growth; it is then the worst of all timber, being more brittle and more apt to crack and fly into splinters than any other; but he adds, I have never known this to be the case with young chestnut. If it be cut when it squares only 6 inches, it will be as durable as an oak of six times its size and age."

From all these varied statements, then, we may conclude, that the absence of spiders is not sufficient evidence to determine whether the woodwork under inspection is oak or chestnut, or even whether it be either of these timbers.

That when the outside of timber presents that rotten dusty appearance generally seen in old roofs, it will be next to impossible to decide whether it be of oak or not; and that the only way to discover the fact will be by obtaining a well-smoothed portion of it, or, if possible, a sight of the ends of some of the pieces, from which to ascertain whether there are any laminæ—the absence of them being the distinguishing mark of chestnut.

That taking into consideration all the evidence collected, there is no proof of chestnut timber having been used in Mediæval buildings: therefore all results which have been promulgated upon the efficiency of a so-called chestnut timber must be valueless as regards that timber.

That certain experiments would appear to decide that small scantlings of chestnut are quite equal, if not superior, to oak for several purposes, "but the wood of old trees is unfit for any situation where an uncertain load is to be borne, as it is brittle." "It bends more than oak at the time of fracture, and therefore is tougher. Its toughness seems to permit it to yield insensibly till every particle exerts its utmost force, and then it gives way at once, more in the manner of metals than in that of woods."* This well-known circumstance alone should have raised a doubt in the minds of some of our instructors, before they affirmed so strongly that chestnut timber had been largely used in our Mediæval buildings.

* Agricultural Chemistry, p. 222, 4to. edition.

* The Forester's Guide, 1824, p. 194.
† Tredgold's Carpentry, p. 225.
‡ 1792, p. 27.

## THE BRITISH ARCHÆOLOGICAL ASSOCIATION IN SALISBURY.

The Salisbury congress of the British Archæological Association is proceeding most satisfactorily. The attendance is very large. Some very good papers have been read, and the reception on the part of the Salisbury people has been hearty in the extreme. The opening meeting was held on Monday, at the Council-house.

The Mayor, Mr. Squarey, who took the chair in the first instance, made a very good speech. Having offered a welcome on the part of the authorities, he said,—He thought they must all feel deep sympathy and great respect for the pursuit to which this Association was devoted. That pursuit was doubtless capable of yielding the highest gratification; but still he thought that if archæological investigations were restricted to that which was ancient, simply on the ground of its antiquity, it would be a barren science and one unworthy of being followed. If he rightly interpreted the scope and object of archæological inquiry, it was for improving and benefiting mankind, by rescuing and preserving all that was beautiful or true in art, all that was valuable or interesting in science or literature, which our forefathers produced or discovered. He might add, perhaps, that the true secret of that fascination which attached to archæological pursuits was due in a large measure to the sympathy they engendered between ourselves and those who had long ended that pilgrimage of life which we were now performing. The city and district which had on this occasion been honoured by the presence of the British Archæological Association was peculiarly rich in objects worthy of the closest attention. The remains of the Celt, the Roman, the Dane, the Saxon, and the Norman lay scattered profusely around. Beginning with Old Sarum, once a remarkable city fortress, nearly every hill-top in the neighbourhood bore traces of human occupation for defensive purposes.

The Marquis of Ailesbury having then taken the chair, and the Dean of Salisbury having expressed the good feeling of the bishop and chapter,

Mr. Pettigrew read a paper on

*The Antiquities of Wiltshire, in reference to those selected for Examination.*

We must confine ourselves to a portion of it:—With regard to primeval antiquities, he said, the field open was of the most interesting character; and prominent in this class must be mentioned Stonehenge—mysterious monuments maintaining the secrets of their origin with indomitable pertinacity, resisting the inquiries of ages, and all efforts satisfactorily to solve the origin of their erection and the purposes to which they were dedicated. The traditions respecting them were too obscure to assist in the solution of the difficulty. Well, therefore, might they have been assigned by the unlettered and the superstitious to the giants of old, and be even conjectured to be but the transformation of their individual bodies into material of such durable and imperishable nature. Diodorus was esteemed the first author to whom we could apply for information. Stukely made excavations in the neighbourhood, and bones of animals, oxen, deer, and other beasts had been found, but no human remains. These were only to be obtained from the circumjacent barrows, which had been rendered so familiar to us by the labours of Cunnington, Hatcher, Hoare, Duke, and others. The connection of the pillars of stone with the astronomical and mythological notions of the ancients had led most authors to connect them with oriental architecture and science, and hence to derive the form and arrangement of the Druidical temple—a temple not enclosed and covered over, but, in conformity with the idea of the power and influence of the Deity, bounded by no limits, enclosed within no scanty shrine, but open to the heavens, realizing the well known and admired lines of Pope, as expressed in his "Universal Prayer:"—

"Whose Temple is all space,
Whose altar, earth, sea, skies!"

That which had been handed down to us, or recorded as belonging to the sacerdotal order in

* Tredgold, 227; and Evelyn.

Druidism, was so closely allied to Oriental customs that we could not be surprised at the conclusion derived from such considerations in regard to those monuments which it would be their good fortune to examine during this congress. The various theories relating to Stonehenge were referred to at some length; but Mr. Pettigrew said he should not attempt to trace the history of Druidism, or to consider whether the Phœnicians were tinctured with its doctrines, or whether they were transmitted to or from the Celts by them. Druidism had generally been regarded as indigenous to the Celtic race: it was probably, also, ubiquitous, and must have come hither with the first stock of that wide-spread family. Circles of stones, varying in magnitude, had been met with in different parts of England, occasionally connected with an interment in their centre, but frequently without signs of burial. When interment had been found, it had been of the class known by the appellation of cromlechs. As he had mentioned, around Stonehenge, but not within it, numerous barrows, presenting interments, had been found. This might account for various legends in relation to its bearing a sepulchral reference. Many, if not all of those accounts were to be looked upon as fabulous, and the statement of Geoffrey of Monmouth, who described the stones as having been brought from Ireland to form a monument to the memory of British princes murdered by Hengist and the Saxons, was not entitled to any credit. Abury, or Avebury, was unfortunately at too great a distance from Salisbury to be embraced among the objects for inspection during this congress. On this subject, however, reference might be made to the valuable researches of their associate, Mr. W. Long, of Bath, in his work entitled "Abury Illustrated." The finest example of earthworks in the county was offered in the remains of Old Sarum. Various were the periods embraced by this most valuable relic. They had ancient British, Roman, Saxon, and Danish, all before their eyes, and they could not too gladly avail themselves of the opportunity afforded them to contemplate its various peculiarities. Old Sarum was known to have been an ancient British fortress—a city of the Belgæ. Alfred made entrenchments and palisades in A.D. 872. It was the seat of a National Council in 960, when King Edgar repulsed the Danes. In 1086, the Conqueror here established the principle of the feudal system. It was at that time a stately fortress, and held in Royal possession. Other councils were held by William Rufus, in 1096 and by Henry I. in 1116. Herman, bishop of Wilton, chaplain to Edward the Confessor, removed from Sherborne, a see united with that of Wilton, and took up his residence at Sarum about the year 1076 or 77. He died in 1078, and could, therefore, have done little, or perhaps nothing, in regard to the building of the cathedral here, which was generally attributed to Bishop Osmund, who, with the assistance of Walkeline, bishop of Winchester, and John of Bath, consecrated it on the 5th of April, 1092, the charter of its foundation being dated one year preceding. The change of church from Old to New Sarum was effected by Richard Pauper or Poore, and of this event Dean William de Wanda had given a particular account. A wooden chapel was begun in 1219. The foundation of the cathedral was laid in 1220. Reference was then made to the churches of St. Thomas, St. Edmund, and St. Martin, in this city, and the general characteristics of the city pointed out. Its aspect was now very different to that which it presented when it was visited by Samuel Pepys, in 1668. Some good specimens of domestic architecture were still to be found, but the greater part had disappeared, to suit the progress of society, and remedy the effects of time.

The party then proceeded to view the various churches and other ancient buildings in the city; and afterwards dined together, Lord Ailesbury presiding. The bishop, the mayor, and others, spoke. The bishop referred especially to an endeavour he is making towards obtaining a county history, and dwelt on the value of archæological research in inducing a love for truth.

At the evening meeting, Lord Aislesbury in the chair,

Mr. J. R. Planché read an elaborate paper "On the Earls of Wiltshire," displaying his usual acuteness, research, and pleasant writing.

Mr. W. H. Black then went through some of the ancient records of the Corporation, and read to the meeting, in English, such parts as seemed valuable. In the course of the examination he read a charter of the eleventh year of Henry III. wherein the king says, referring to the cathedral,—In the foundation of which church we have laid the first stone. This is contrary to the received account of the ceremony.

On Tuesday morning a party visited Old Sarum, under the guidance of Mr. Swayne and Mr. Irving, and then, at one o'clock, met the remainder of the body at the cathedral, where Mr. C. E. Davis accompanied them round the structure with a running commentary. Of this we will give some notes hereafter.

The members attended service (the choir sang very badly by the way), and then

Mr. J. R. Planché described the tombs in the cathedral, commencing with the flat coffin-shaped stone, of Purbeck marble, which is generally considered the oldest monument in the church, and which is conjectured to have been brought from Old Sarum, with the bones of Bishop Herman, who died in 1078. He then noticed the tomb of Bishop Roger, who died in 1139, stating that he concurred with Mr. Gough in assigning the tomb to this bishop. In noticing the next tomb, that of Joceline, at the west end of nave on the south side, he pointed out that the head had been added to the original figure, as was evident from the nature of the stone of which it was composed, and also from the shape of the mitre. The slab is of the twelfth century, the mitre a century later. He then noticed the plain slab alleged to have covered the remains of Osmund, and the effigy ascribed to Bishop Poore, who was buried at Durham. From the fact of a skeleton having been found some years ago beneath this tomb, he was not inclined to ascribe this monument to that prelate. He next described the monument of Giles de Bridport, who was bishop from 1256 to 1262. He then noticed the other monuments, including the brass to the memory of Robert de Wyville, the tombs of Bishop Beauchamp, Robert Lord Hungerford, William de Longespee, Lord John Cheyney, Sir John de Montacute, William Longespee, son of the Earl of Salisbury, and the Somerset monuments. His attention was, however, more particularly directed to the Boy Bishop, on which he remarked as follows:—"I have purposely left to the last the effigy so well known as the Boy or Chorister Bishop, as I am not quite satisfied with its appropriation. There is no doubt that it was the ancient custom here, as well as in other cathedrals, for one of the boys of the choir to be elected on St. Nicholas's day (Dec. 6th) a bishop; and from that period to the 28th of December, the day of Holy Innocents, to be apparelled in the episcopal vestments, and with mitre and pastoral staff perform all the ceremonies and duties of a bishop, excepting mass, and it has been asserted by Mr. Gregorie that if the boy chanced to die during that period, he was buried with all the state and reverence due to a bishop. Of this latter circumstance I desire some evidence: such an occurrence would naturally be rare, and I think could hardly have escaped being specially chronicled in the records of this cathedral. If it be not, I shall continue to believe that this effigy, like that of the knight at Horsted Keynes,* and other examples, represents a person of full age, and has been executed on a smaller scale only in compliance with the desire of the deceased or his family, or the fancy of the sculptor. I am inclined to consider it as commemorating one of the bishops of Salisbury, who died somewhere about the close of the thirteenth century—Robert de Wickhampton, or one of his successors probably, who are known to have been buried in this cathedral, but whose tombs have not been identified. Had the figure under consideration been intended to represent a boy, it would surely have been of life size; but it is too small to be considered the portrait of any chorister boy, and if it be a miniature effigy, what argument is there that will hold against its being a man's? The error evidently arose in the first impression that it was that of a boy, and the discovery by Gregorie of the ceremonial of the chorister bishop in the statutes of the cathedral, led him at once to jump at his conclusion. I may add that it was not originally a recumbent effigy, but evidently, from the canopy over it, had occupied an upright position against some work or column."

A *conversazione* at the Bishop's Palace wound up a long day.

On Wednesday the Association went to Wilton, examining Wilton House and Mr. Sidney Herbert's church. Touching the latter, a paper was read by Mr. Godwin, the substance of which will be found on another page.

---

Cement for Stopping Leaks.—A composition of 4lbs. of rosin, one pint of linseed oil, and 1 oz. of red lead, applied hot with a brush, it is said, will stop leaks in roofs, water-butts, &c.

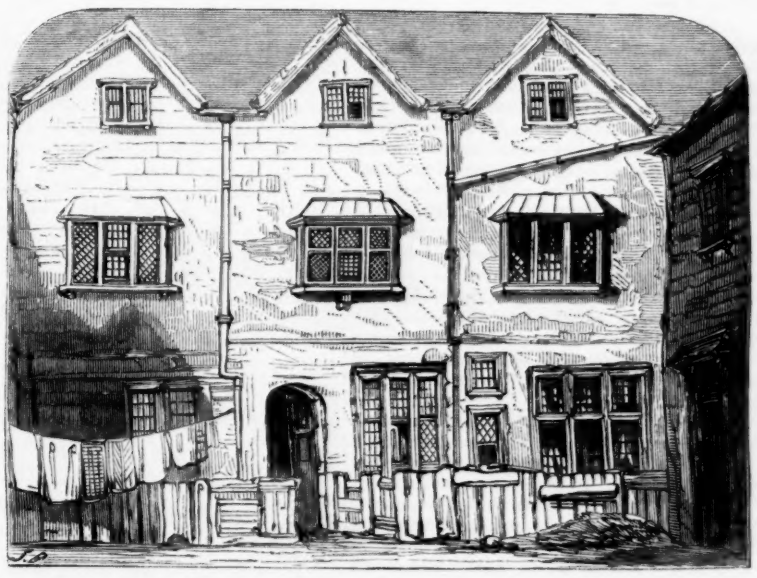
* Of which we gave an account not long ago.

## THE LONG-LANE DISTRICT OF BERMONDSEY.

Every street has a story, and a ramble in any part of London, amidst the throng of men, each pursuing eagerly his particular object, has powerful interest to those who rightly view it. Our readers have walked with us through many parts of it. Let them now go with us to where once stood the famous Abbey of Bermondsey. In starting from the granite statue of William IV. notwithstanding that all vestiges of the market of "Cheap," and the old houses, shops, and taverns of Shakspeare's time have vanished, and buildings less picturesque, but more suitable to present conditions, have taken their place, the London antiquary will remember the "Boar" which once stood close by this spot, the dark portcullis'd gateway of the old bridge, fitted with the stocks, whipping-post, and pillory, and the view rendered more impressive by the grim and weather-beaten heads of traitors which were exhibited on its summit.

The roadway of the new bridge which, notwithstanding its great width and level roadway, is barely sufficient for the increased traffic, forms a curious contrast with the narrow passage between the rows of shops and dwellings which occupied such a large portion of the old structure. The Thames no longer roars and dashes through narrow arches, but glides smoothly along, the water-way below the modern bridge being as great an improvement as is the clear passage above. The crowds of shipping, the steamers for home and foreign trade or pleasure, the crowds and seeming confusion at the railway terminus, and the new fashion of many of the shops in the Borough High-street, all indicate the onward progress of this great capital. Although so many house fronts have presented a new face, there are several bits of Old London remaining in the inns and other yards, the sight of which will repay the trouble of a visit to those who are curious in such matters. Passing the church on the south side, and along White-street to Long-lane, we reach the site of the ancient abbey. As regards sanitary condition, this district has for long had a bad reputation, and although much has been done to improve the health of the inhabitants by drainage, and the supply of a better description of water, the neighbourhood still requires very great care. Many of the courts which run from the main street are thickly inhabited by very poor tenants. The water supply of some of these places seems very uncertain, and needs improvement. In Newcourt, which is chiefly inhabited by Irish families, the water was running from a tap connected with the main, and the people were busily engaged in filling the tubs and other vessels in their possession. On inquiring if they had sufficient water, some of the women said that they had enough for every purpose; but others said, "Why, you know that by to-morrow afternoon there will not be a drop of water in the court." At the time of our visit it was five o'clock on the Saturday afternoon, and no more water would be turned on until the *following Monday, at about five o'clock in the afternoon.* In this case the poor people are left for forty-eight hours without any fresh supply of water, and our readers know that few of them have vessels of sufficient size for the purpose of keeping water to last a family for two days; and even if the case were different, the water kept for so long, in a close and impure atmosphere, could not be wholesome. On making inquiry at other places near, we were told that the water was supplied on Sundays. Some thought that it depended on the turncocks, and remarked that it was very hard to be left without water on the Sundays, and also on such holidays as Good Friday and Christmas-day. The officers of health should look to this, and no doubt the Lambeth Water Company would endeavour to remedy an evil which is suffered only by the very poorest of their customers.

Long-lane is a wide and straight road which leads to Abbey-street and George-street: many of the houses are of considerable antiquity, and have been built at intervals along what, at the beginning of the present century, was a country highway: some brick dwellings, with richly carved doors of Charles I.'s reign, and a clump of timber houses much older, are still visible. The road has risen two or three feet since these were built. The gaps which formerly existed in Long-lane, and which were occupied by gardens, &c. now form a continued line, except where broken by the entrances to the large tan-yards, which are considered by some to be beneficial to the health of those who dwell near. A person engaged in one of these works said that he had known people, when very ill, brought there for two or three hours



SOUTHWARK: LONG-LANE, BERMONDSEY.

to have the "benefit of the air." It is asserted too that no tanners died of the great plague in London in 1665. We have doubt on the matter, however, and know that, without great care and excellent drainage, such works cannot be safely carried on in crowded neighbourhoods. We remember some years ago being told by a celebrated horse-slaughterer on the banks of the Fleet, that people visited his yard when ill of consumption. Horse slaughterers and butchers boast that the pursuit of these businesses leads to the duration of life: statistics, however, show that the lives of the London butchers are not longer than those of the publicans, who, with the exception of the compositors and a few other trades, are the most remarkable for living less than the average number of years. Some of the courts in Long-lane have very narrow entrances, but generally the ground is not overcrowded with houses, and most of them are in tolerable condition, and, where the drainage has been attended to, are comfortable dwelling-places for families. Some of the small houses, with three rooms, wash-house, &c. let for 5s. 6d. a week, and others, with four rooms, 6s. 6d. a week. In many of the courts and squares new cisterns and dust-bins have been put up, and, where houses have not separate accommodation, closets have been erected, one for each house: in some instances the doors are fitted with locks, and key supplied to each family. Some spots were neglected and dirty, with stagnant water in pools,* but in most instances a most praiseworthy attention is shown to cleanliness. Sad tales are told of the sufferings of large numbers during the past winter, and many of the little children look very sickly. We have now, however, arrived at the end of Long-lane, and, crossing over Bermondsey-street, come to Abbey-street. At a short distance along this is a modern hostelry, called the "King John's Head." This house was erected on the site of the northern gate of the abbey precincts.

An opening here leads to Bermondsey-square, and at the north-eastern corner is Long-walk, in which the portion of ancient work shown in the engraving is situated. The basement of the building is evidently older than the upper portion. The square, of which the old houses form one side, is chiefly inhabited by Irish. Comparing the place with what it was six or seven years ago, it is gratifying to notice a marked improvement in the cleanliness and other sanitary arrangements of the place. The people themselves are also evidently improved: the interior of the dwellings is more carefully kept, and the dresses of the girls and women form a marked contrast to those worn by the same class of persons who were in a multitude driven over by the Irish famine.

Having already noticed the difficulty in connection with the water supply at New-court and elsewhere, and feeling both that cisterns and sunk reservoirs are insufficient for poor districts, and that the supply of water from the main at intervals does not answer a useful purpose, we were glad to meet with the application of an invention which consists of a communication with the main water-pipe, whereby, on the movement of a handle, a certain quantity of water is poured out. By this contrivance the inhabitants of any court can have a supply of water at all hours of the night or day.

Mr. Payne, the proprietor of some house property in this neighbourhood, says that he finds this to answer well, and believes that they must come into general use. At any rate, the invention deserves examination.

* Victoria Court and Place are much neglected.

## ON THE STRENGTH OF CAST-IRON PILLARS.

Mr. Eaton Hodgkinson having sent to the Royal Society, of which he is a fellow, a paper on his experimental researches on the strength of pillars of cast-iron, the following abstract has appeared in the printed proceedings of the Society (No. 24, vol. viii.):—

In a previous paper on this subject (Philosophical Transactions, 1840), I had shown,—1st, that a long circular pillar with its ends flat was about three times as strong as a pillar of the same length and diameter with its ends rounded in such a manner that the pressure would pass through the axis, the ends being made to turn easily, but not so small as to be crushed by the weight; 2nd, that if a pillar of the same length and diameter as the preceding had one end rounded and one flat, the strength would be twice as great as that of one with both ends rounded; 3rd, if, therefore, three pillars be taken, differing only in the form of their ends, the first having both ends rounded, the second one end rounded and one flat, and the third both ends flat, the strength of these pillars will be as 1—2—3 nearly.

The preceding properties having been arrived at experimentally, are here attempted to be demonstrated, at least approximately.

The pillars referred to in my former paper were cast from Low Moor iron No. 3 · they were very numerous, but usually much smaller than those used in the present trials. I felt desirous, too, of using the Low Moor iron in the *hollow* pillars employed on this occasion, not on account of its superior strength, but its other good qualities. The pillars from this iron were cast 10 feet long, and from 2½ to 4 inches diameter, approaching in some degree, as to size, to the smaller ones used in practice. The results from the breaking weights of these were moderately consistent with the formulæ in the former paper, with a slight alteration of the constants, rendered necessary by the castings being of a larger size, and therefore softer than before, a matter which will be adverted to further on.

The formulæ for the strength of a hollow pillar of Low Moor iron No. 2,—where $w$ is the breaking weight, in tons, of a pillar whose length is $l$ in feet, and the external and internal diameters D and $d$ in inches, the ends being flat and well bedded—are as below:—

$$w = 46{\cdot}65 \times \frac{D^{3{\cdot}55} - d^{3{\cdot}55}}{l^{1{\cdot}7}},$$

from formula in Phil. Trans. 1840:

$$w = 42{\cdot}347 \times \frac{D^{3{\cdot}5} - d^{3{\cdot}5}}{l^{1{\cdot}63}},$$

from formula in present paper.

To obtain some idea of the relative strengths of pillars of different British irons, I applied, at Mr. Stephenson's suggestion, to Messrs. Easton and Amos, who procured for me twenty-two solid pillars, each 10 feet long and 2½ inches diameter, cast out of eleven kinds of iron (nine simple irons and two mixtures). The pillars were all from the same model, and were cast vertically in dry sand, and turned flat at the ends, as the hollow ones had been; two being cast from the same kind of iron in each case. The simple unmixed irons tried were as below, and all of No. 1.

| | | Mean breaking weight. |
|---|---|---|
| Old Park iron ... | Stourbridge..... | 29·50 tons. |
| Derwent iron ... | Durham ..... | 28·03 „ |
| Portland iron ... | Tovine, Scotland... | 27·30 „ |
| Calder iron ..... | Lanarkshire ..... | 27·09 „ |
| Level iron..... | Staffordshire ..... | 24·67 „ |
| Coltness iron ... | Edinburgh ..... | 23·52 „ |
| Carron iron ..... | Stirlingshire ..... | 23·52 „ |
| Blaenavon iron... | South Wales ..... | 22·05 „ |
| Old Hill iron ... | Staffordshire ..... | 20·05 „ |

The mean strength of the pillars from the irons above varies from 20·05 to 29·50 tons; or as 2 to 3 nearly.

The pillars formed of mixed irons were found to be weaker than the three strongest of the unmixed series.

From many experiments, it was shown that the weight which would crush the pillars, if they were very short, would vary as 5 to 9 nearly.

The pillars in general were broken of four different lengths, 10 feet, 7 feet 6 inches, 6 feet 3 inches, and 5 feet, the ends of all being turned

flat, and perpendicular to the axis. It was found that when the length was the same, the strength varied as the 3·5 power of the diameter; and when the diameter was the same and the length varied, the strength was inversely as the 1·63 power of the length. Both of these were obtained from the mean results of many experiments.

The formula for the strength of a solid pillar would therefore be

$$w = m \times \frac{d^{3.5}}{l^{1.632}}$$

where $w$ is the breaking weight, $d$ the diameter in inches, $l$ the length in feet, and $m$ a weight which varied from 49·94 tons in the strongest iron we tried, to 33·60 tons in the weakest.

The ultimate decrement of length, in pillars of various lengths but of the same diameter, varies inversely as the length nearly. Thus the ultimate decrements of pillars 10 feet, 7 feet 6 inches, 6 feet 3 inches, and 5 feet, vary as 2, 3, 3½, and 4 nearly, according to the experiments, from which it appeared that the mean decrement of a 10-feet pillar was ·176 inch.

*Irregularity in Cast Iron.*—The formulæ arrived at in this paper are on the supposition that the iron of which the pillars are composed is uniform throughout the whole section in every part; but this was not strictly the case in any of the solid pillars experimented upon. They were always found to be softer in the centre than in other parts. To ascertain the difference of strength in the sections of the pillars used, small cylinders ¾ inch diameter and 1½ inch high, were cut from the centre, and from the part between the centre and the circumference, and there was always found to be a difference in the crushing strength of the metal from the two parts, amounting perhaps to about one-sixth. The thin rings of hollow cylinders resisted in a much higher degree than the iron from solid cylinders. As an example, the central part of a solid cylinder of Low Moor iron No. 2, was crushed with 29·65 tons per square inch, and the part nearer to the circumference required 34·59 tons per square inch: cylinders out of a thin shell half an inch thick, of the same iron, required 39·06 tons per square inch; and other cylinders, from still thinner shells of the same metal, required 50 tons per square inch, or upwards, to crush them.

As these variations in cast iron have been little inquired into, except by myself, and have never, so far as I know, been subjected to computation, I have bestowed considerable trouble upon the matter, in an experimental point of view, and endeavoured to introduce into the formulæ previously given, changes which will in some degree include the irregularities observed.

## USE AND ABUSE OF RED BRICKS.

THE LEICESTERSHIRE ARCHITECTURAL SOCIETY.

THE annual meeting of this society was held at Market Harborough on Wednesday, the 28th ult. when several papers were read, including one "On the Use and Abuse of Red Bricks," by the Rev. E. Trollope, of which we give a portion:—

"Bricks are not only a necessity, but a building material for which a deep debt of gratitude has been justly due from a very remote period to the present time: moreover, it will be my endeavour to demonstrate how they maybe made to please the eye of him whose apprehension of colour is most complete by their judicious use combined with a slight distribution of other tints, serving to relieve the monotony of their usual hue. . . . Red brick was a favourite building material in the reigns of Henry VIII. Elizabeth, and James I. as instanced by the many beautiful buildings existing throughout the country belonging to that date. . . . During the reigns of the two Charleses, brick was not much in vogue for building purposes, but it again strongly prevailed in the reign of William III. who, fresh from his beloved Holland, hastened to raise up reminiscences of his native land, in the brick additions with which he entirely spoiled the previous beauty of Hampton Court Palace, and has transmitted to us a specimen of his taste in the so-called Palace at Kensington, in which the red masses to be seen at Amsterdam have been repeated, but without any of the picturesque gables and stone dressings which there tone down this somewhat difficult hue to deal with. Unfortunately, the Georgian era possessed no architectural life, and London, content to pursue the Kensington style, has become a brick monster which may well cause metropolitan artists and architects to shudder at the very name of brick, although it need not, I think, drive them into the arms of Mr. Stucco as the only means of escape from the dingy yellow or dull red series of façades surrounding them on every side: neither would it by any means be hopeless to throw a beautiful shadow over the town of Harborough, although at present its street architecture cannot boast of any attractions. Here, as in London, a child could in three minutes represent the appearance of hundreds of houses: he has nothing to do but to take an oblong piece of dull or bright red paper, to cut out of it from five to eight smaller oblongs, placed at regular intervals in three rows one above another, and to fill these in with bits of glass, in order to present us with a correct model of London or Harborough street architecture. But is there any positive necessity for repeating such productions? Why should modern brick houses always be so ugly when old edifices of the same material are often esteemed so beautiful that gentlemen of acknowledged talent and taste, and still better architects with a true love for their art, will travel many miles to see such an edifice as that of Tatershall or Torksey castles. And lest it should be said, 'Here you are comparing small things with great,' I will observe that several of the beautiful specimens of brickwork I have before alluded to are by no means large, and that with a few modifications they would be readily divisible, and adapted to form portions of streets, whether of shops or of private residences."

After alluding to the beauties of Italian brick architecture, which he said we should do well to copy in the building of our churches, he passed on to the consideration of the use of bricks in the construction of dwelling-houses.

"A first-class shop would have you suppose that its two or three uppermost stories were supported by the very fragile foundation of glass, although we know perfectly well that a couple of mean-looking cast-iron pillars behind this screen are really doing all its work—are the domestic Atlas—the Birmingham penates of the establishment; but granted, that this expanse of exhibitionary power is needful, it might be secured equally well by a large flat-headed arch thrown over the whole ground-floor front, and the house would gain much as to architectural appearance by the substitution of so natural a constructional feature. Two or three small specimens of ancient arched shop-fronts still exist at Lincoln, and many fine examples in some continental towns. A variation in the size of the upper windows would be a great relief to the eye externally, and would enable them to be better adapted to the proportions of the several rooms internally. Their shape also would be greatly improved by finishing them above with flat, round, or pointed arches, according to the style of architecture adopted, instead of with the horizontal brickwork now usually seen, and not unfrequently aggravated by the application of sham keystones in cement, which, after a time, begin to flake off, from their impatience at having been pressed into so ridiculous and so false a position! Next, the removal of ugly and useless parapets, and the application of stepped gables, such as abound in Holland, Belgium, and parts of Germany, and the adoption of shadow-catching octagonal chimney-shafts, instead of the present meaningless masses of brickwork usually erected, would substitute lightness and comeliness of outline for dull monotonous horizontal lines. Lastly, we would recommend an attack upon the flatness of surface now almost always prevalent in brick buildings. Even where space is of great value, and porches, buttresses, or other bold projections are not admissible, base-mouldings of stone or brick, and elevation breaks of even a few inches are of much value, and with a string-course or two of moulded bricks, or even of rubbed ones, any tradesman could possess a shop of which he might be justly proud, without having recourse to sham and unenduring ornaments of stucco, and with but little need of the painter's brush."

A paper was read by Mr. Wing, "On Gothic Architecture and English Churches," the bearing of which will be understood from the following extract:—

"Out of its proper sphere, the employment of the Gothic, notwithstanding ancient precedent, is detrimental to it, and its inferiority in such cases may be more than questionable. At all events, we protest against the invitations to Gothicise our streets and lanes. This would produce a surfeit, and take away the background required to give due effect to our public buildings by way of contrast. In our attachment to a style, and in our attempts to do it homage, let us not profane or overlay it. In recovering what is valuable, we must not retrograde. We would appreciate the treasures of Mediæval art, but we would not be Mediævalized.

If we make a sacred appropriation of this precious legacy of our forefathers, it is especially incumbent upon us to secure its integrity and freedom from debasement. It has been seductively held forth, that with the Mediæval artists all was progression, and that we should follow their example by endeavouring to work into a new phase, that we may obtain improvement upon the past. But did not Gothic architecture exhaust itself in its various stages of introduction, maturity, and decline? Did the latter half of the fourteenth century, with all its effort, effect advancement? Or did the fifteenth, with its extraordinary elaborations, equal the preceding periods? Certainly not. And we apprehend that the attempt to infuse new elements, and to produce a new composition that can be consistently called Gothic, and be worthy of church appropriation, will be equally fruitless. It is from within, rather than from without, we are of opinion, that improvement will be derived; by diving into the spirit, and mastering the principles of this natural art; not by launching into another sea."

## THE WORKS AT CHERBOURG.

THE works at Cherbourg are of a gigantic description, and have been carried on during seventy years. The principal works, so far as the marine engineers are concerned, were completed by 1854, at a cost of nearly three millions sterling. Mr. G. R. Burnell gives the following interesting information concerning the works. He says, in general terms, the Cherbourg breakwater may be described as presenting a mass of rubble stone, having a slope, from the bed of the sea to the level of nearly 22 feet below high water line of spring tides, towards the roads in the ratio of one base to one in height (1 to 1). The top of the mass then has a much more gentle inclination; for in the width of 19½ feet its inner summit attains the level of 15¾ feet below high water line, and there it stops against a wall, almost vertical, rising 7 feet above the same high water line or datum. There is a level platform at this height, of 20½ feet wide, on the eastern arm, and 21 feet wide on the western arm; and beyond it there is a solid masonry parapet (about 5 feet high, and rather more than 8 feet wide) towards the sea. The outer line of this parapet is, in fact, in the continuation of the sea face of the wall, and the latter has been built of coursed and dressed masonry, laid with the greatest care, and composed of the very best materials, upon a general bed of hydraulic concrete 5 feet thick, laid over the loose rubble hearting. The bottom of the concrete is about 29 feet below datum. Beyond the edge of the masonry which protects the foot of the vertical wall, the top of the rubble hearting of the breakwater has assumed a slope of 1 in 10 towards the open sea under the influence of storms. This slope continues until the top line has descended to 47 feet below datum, and thence it continues to the bottom at the rate of 1½ to 1.

The small materials used in the hearting of the breakwater are naturally exposed to be displaced by storms. Of late, however, a very effectual mode of protecting the sea slope has been adopted, consisting of huge artificial blocks, cubing not less than 26 yards, placed upon those portions of the breakwater which are most exposed to the effects of the sea. These blocks are composed of rubble masonry and of Portland cement mortar, the cement being English, of the manufactory of White and Sons, Westminster.

Returning, however, to the consideration of the general plan of these offensive and defensive works, we find that there is at the apex of the angle formed by the meeting of the two branches of the breakwater a large central fort having a total development of about 509 feet, measured on the inner line of the parapet, which forms a very flat semi-ellipse. Behind this battery there is to be raised an elliptical central tower, measuring 225 feet on the major, and 123 feet on the minor axis. A casemated fort, of about 190 feet front, is to be formed on the western or longer branch, and two large circular forts are placed at the extremities of the breakwater; that of the eastern end being 100 feet in diameter, and that of the western end about 133 feet in diameter.

The military port of Cherbourg consists of an outer harbour, 776½ feet long by 662¾ feet wide, with a *minimum* depth of water of 58½ feet. The channel at the entrance is 206 feet wide at the narrowest point, and is usually 530 feet wide. The cost of this outer harbour was estimated at nearly 680,000*l*. Beyond it, and communicating with it by means of a lock of about 130 feet long and 58 feet 7 inches wide, is a floating basin 957 feet long by 712 feet 9 inches wide. There are on the opposite side of the outer harbour to this

floating basin, four fine covered building slips for 120-gun ships, and a graving dock close by a caisson, besides some uncovered slips for building smaller classes of ships. The building slips for vessels of the line are 383 feet long by 78 feet 8 inches wide. The graving dock is 245 feet long by about 78 feet wide, with a depth of water over the sill of about 27 feet 6 inches.

The inner floating harbour has been inaugurated. It is parallel to the first floating basin, and will communicate both with the outer harbour and the basin. It is about 2,788 feet long by about 1,312 feet, and is entirely excavated out of the solid rock—a member of the transition series, extremely hard and tough. All round this marvellous sheet of water are a series of graving docks and building slips of remarkable beauty, so far as we may judge of them by their present state, at least; and immediately beyond the quays are the various magazines, storehouses, sail lofts, shops, &c. which, when complete, will render Cherbourg one of the most complete arsenals in Europe. There is still much to be done, and a very great additional outlay must be incurred before this port can be considered to be complete; but, unquestionably, when the works still unfinished shall have been executed, Cherbourg will constitute one of the most formidable military and naval posts in the world. The tales we hear of its quays being adapted for the embarkation at one time of 100,000 men are of course absurd; but, even when all allowances are made for the terror and excitement of the moment, it must be a matter not only for admiration of the skill and energy of the French Government and of the French engineers in effecting the great things they have done, but, also, it must be a matter of importance to us, to inquire whether we at home have a military and naval harbour so well and so conveniently arranged as is the one at Cherbourg. It is very difficult to ascertain the precise cost of such mighty operations as those above mentioned; but it is certain that the harbour works and breakwater of Cherbourg must have cost at least between 6,000,000*l.* and 7,000,000*l.* sterling. Costly as they have been, however, they appear to answer the purpose for which they were designed.

## THE TOWER OF ST. MARY'S, TAUNTON.

I UNDERSTAND the Taunton tower is now down; and, therefore, now or never is the time for the good people of that place to consider seriously whether they are wise in requiring or allowing Messrs. Scott and Ferrey to build up again as close a copy of the old tower as they can. We had exactly the same question to consider at Doncaster. During the first three years of the rebuilding of the church, nobody ventured to propose openly any deviation from the old model of the tower, although the rest of the old church was not thought worth copying, and the style was changed in Mr. Scott's first designs. By degrees, however, as I had always expected, as the body of the church rose to the height at which the tower springs from the roof, the conviction rose with it that the style of the best period of architecture ought to be capable of furnishing better towers as well as better naves than the declining period of the Perpendicular style. And when the critical moment of beginning to build the tower came, and Mr. Scott produced the drawing I had requested him to make of a tower with the same outline and general arrangement, but designed on the principles of the thirteenth century instead of the fifteenth, the question seemed to answer itself, and the warmest admirers of the old tower acquiesced in the alteration. It is now finished; and if there are any persons at Taunton enthusiastic enough about their own building to come and see this, and compare it with the pictures of the old church, or with Mr. Scott's first picture of the new church with a copy of the old tower attached to it, I believe they will go home convinced that they ought to do as we have done.

I am by no means insensible to a few mistakes which have been made in this tower; but it is very remarkable, and I beg the attention of the Taunton people to it, that the most serious mistake has occurred at the point where the old arrangement was professed to be copied most exactly. Notwithstanding this, however, the new tower is unquestionably very superior to the old, as a whole, and especially in those parts which are really and entirely new, and have no pretence of imitating the old—I mean the windows; and as a whole, there is no town in England of any age for which I, or I believe any one here, would like to exchange it.

The Taunton people must remember, notwithstanding their natural prejudice in favour of their old tower, that it is gone irrevocably. This is no question of partial restoration, where of course the old pattern should be adhered to; but the new tower will not be the old, nor be in the smallest degree, or by the least experienced eye, mistakable for it. Everybody who has paid attention to the very best "restorations" will confirm that. They will find, too, in such books as Britton's "Antiquities," that, famous as their tower was among those of its class, it was considered by no means free from the defects of its class and period of architecture, which was almost, if not quite, the expiring period of Gothic architecture. The monotonousness of its four-and-twenty windows, all alike as four-and-twenty blackbirds, and with not the slightest variety, even in the position of the three stories of them, was a defect of the first magnitude. In that respect it contrasted lamentably with the old tower here, which was built about half a century earlier, and was remarkable for the elegant and skilful variation in the position and size of the upper and lower windows. The elaborate and spiritless repetition of rectangular panelling and piercing at the top of the Taunton tower—of course the latest part of the work—was not even one degree removed from baseness.

No such defects could have occurred in a tower of the thirteenth or the earlier part of the fourteenth century; and I am persuaded that none such would be found in a tower designed now in the style of that period by architects such as those engaged on this work. The people of Taunton have an opportunity, which will very soon be gone for ever, of doing with a west or disengaged tower of the first magnitude among parish church towers what we have done with a central one; and, after the experience of one of their architects at Doncaster, they ought to do it still better than we have. At any rate, they should make their architects try, not necessarily in stone until they are satisfied on paper. This loss of a few weeks' time in such a matter is not to be thought of, and a decorated tower need not cost a penny more than a copy of their old perpendicular one. As for the architects, no doubt it would be less trouble to let their clerks make working drawings from the old measurements; but even if they were disposed to take that low and mercenary view of their art (which is not likely with either of them), they must remember that of a tower built in that way they will have no claim to be considered "architects," but merely a sort of head clerks of the works; whereas, if they design such a building as I know may be designed for that place, they will have the glory of doing, and Taunton of possessing, such a tower as has not been built in the world since Gothic architecture began to fall, four hundred years ago. E. B. DENISON.

## THE ARCHITECTURAL MUSEUM AND THE GOVERNMENT.

PERMIT me to trouble you with a few remarks on your recent article on the position of the Architectural Museum with reference to the Department of Art.

I think that there can be but one opinion as to the fact that the work we have for the last six years been carrying on with very great personal exertion is not a *private* but a *public* work. We undertook it simply because the Government refused to do so, though so manifestly their duty: but it is clear that it is too great a work to be carried on wholly by private means, and that it is in every way desirable that the Government should afford to it their powerful aid. Had they been the first to undertake it, no one would have thought of objecting to their having its entire management; but as they, by so long refusing to do so, compelled others to originate the work, the question is now, how far those who have so successfully launched the undertaking shall continue to direct it if Government aid be afforded.

The Government have already given us house-room, as they have to many other Societies: they have also deposited in our Museum many valuable objects of study.

The objects of our recent memorial to the Government were two-fold:—First, That as the students in their Schools of Art have free admission to our Museum and to our lectures, the Department should become annual subscribers to our funds to the extent of 100*l.* per annum; and, secondly, That the system already commenced by them of depositing objects of study with us should be systematized, and that we should be allowed, as an acknowledged custom, to recommend from time to time for their consideration such objects as we might think suitable.

The following is their reply to these two proposals:—

"My lords desire me to express their regret that they do not feel justified in entertaining the application of your committee in the form in which it is proposed in the memorial; but at the same time, if the committee are willing to deposit the collection on loan, and entrust it to the Department on the same terms as other exhibitors, they would be prepared to meet the wishes of the committee by providing for the custody of the collection, and relieving them of the charge of the keeper.

With reference to the proposal of the memorial regarding the purchase from time to time of additional casts, I am to say that their lordships will be happy at all times to receive any suggestions of the kind, and to give them their best consideration."

Now, whatever may be the merits of the counter proposal contained in the first paragraph, I am, I confess, at a loss to discover in it even the faintest foreshadowing of the magnificent offer which our curator seems to have discovered in it. It expresses to my apprehension nothing but the bare fact that if we will place ourselves precisely on the same footing with the exhibitors of raw material and manufactures, we shall be treated as they are; or, in other words, if we relinquish the control of our Museum and our curator, we shall be saved his salary. This was the interpretation which I, in my simplicity, put upon the proposal, and, as I believe, which the Committee, without any communication with me, put upon it, and which, I take the liberty of saying, is the only one the words will bear, and which I am inclined to think was the only meaning they were intended at the time to convey.

We may be very much in the wrong, but,—so understanding the proposal,—I beg to assert my opinion that they were right in refusing any such offer. If, on the other hand, it meant all which our curator says it meant, and all which you seem to think it meant, I am free to admit that (though the words convey to my mind no hint, even, of such a meaning) there is nevertheless room for negotiation; which, so far as I am concerned, and I think I may speak for the committee, would be conducted in a perfectly friendly and liberal spirit.

G. GILBERT SCOTT.

---

SIR,—The committee cannot entirely pass over the leading article in last week's *Builder*, relating to the offer made by the Department of Science and Art for "loaning" the Architectural Museum, without some reply. Whilst we are sure our own subscribers and well-wishers will give us credit for having, by their help, made the collection what it is—and a good way towards being a *national* one—there are *those* who ought to help us by good word and in pocket, who might otherwise consider our silence as an excuse for not giving us their future assistance, or indeed thinking there is want of assistance at all.

The committee fully and carefully considered the offer made by the Department,—though it seemed a little out of place, in reply to an application for the renewal of the grant made in 1856, to receive as an answer that "if the committee are willing to deposit the collection on *loan*, and intrust it to the Department on the same terms as other exhibitors, they would be prepared to meet the wishes of the committee, by providing for the custody of the collection and relieving them of the charge of the keeper."

It was certainly not very clear what was meant, but finding Capt. Fowke, R.E. had been deputed to explain more fully the intentions of the Department, an interview took place, and at a full meeting of the committee, Mr. Beresford Hope being in the chair, the explanation appeared so clearly to show what would be our future position, and also being reminded that beggars must not be choosers, it was at once decided the "loan" would not secure the independent position guaranteed when we left Canon-row and took up our present quarters at Brompton. The committee have all along desired to maintain the most friendly relations with the Department, and by every means to acknowledge the assistance rendered them; but it is now still more obvious than ever that the private influence which brought the Museum into existence must still maintain it. As an independent body it will always, so long as it is rightly managed, have the support of those interested in art education; but if once absorbed into a mere Government collection, it will no longer fulfil its object. It is true the control of the Museum was said to remain with the committee, but it must have been a mere nominal authority over its direction, with none over its custodian. Beyond the recent letters in the *Builder* and the article now alluded to, no other intimation has reached the committee that their decision has not met with the approval of our supporters; on the contrary, apart from the success of the recent *conversazione*, with the increasing sphere of its usefulness, the subscription-list of the Museum continues to increase, and the

committee trust that ere long the present debt will be cleared off, and that then, being no longer beggars, we may walk in sunshine.

Joseph Clarke, Hon. Sec.

## PROVINCIAL NEWS.

*Lynn.*—The new Savings' Bank building in St. James's-street, according to the *Norfolk Chronicle*, is now rising into view. The style adopted is the Tudor, and the material employed is red brick, chequered here and there with black, and faced with stone. The front is set back a few feet from the footway.

*Wisbech.*—The Wisbech new Corn Exchange has been inaugurated. After public competition in tenders, the committee appointed for the purpose accepted that of Messrs. Sharman and Son, of Spalding, who undertook to carry out the design of Messrs. Bellamy and Hardy, the architects, for the sum of 2,750*l.* This amount was raised by 800 shares of 5*l.* each, and the money being forthcoming, the present building gradually rose, under the direction of Mr. Yeoman, as clerk of the works, the commencement having been made in October last. The dimensions of the Exchange are 109 feet long by 49 feet wide. The style (if any) is Italian, with an arched glass roof: convenience and applicability to uses have, however, been studied rather than appearance.

*Hertford.* — A special meeting of the town council was held on the 17th ult. to decide upon the tenders received for the proposed alterations and improvements of the Corn Exchange, so as to combine a public reading-room in connection with the free library. The following tenders were received:—Messrs. Patnam, Enfield, 943*l.*; Messrs. Benton and Co. Leeds, 942*l.*; Mr. Thomas Lawrance, Hertford, 929*l.*; Mr. Henry Norris, Hertford, 907*l.*; Mr. George Ekins, Ware, 903*l.*; Messrs. Woolley and Co. Leeds, 894*l.* There were three other tenders; but, as the amount considerably exceeded the sum mentioned in the advertisement, they were not taken into consideration. The tender of Mr. Henry Norris was accepted, amounting to 907*l.* exclusive of the proposed statue vases, arms of the borough, and other carved work, to be provided by the architect, Mr. William Hill, of Leeds, for 109*l.* 10s. The work of pulling down the old corn exchange has since, according to the local *Mercury*, been commenced by Mr. Norris, and the roof is already removed.

*Wokingham.* — The committee appointed to carry out the Town Hall and County Police Station scheme have obtained plans for the building from seven architects who were invited to send in designs. The following are the names of the competitors: Mr. J. B. Clacy, Mr. W. Brown, and Messrs. Poulton and Woodman, of Reading; Mr. Horace Jones, Mr. C. Fowler, jun. Mr. J. Turner, and Messrs. Judge and Winstanley, of London. The designs were arranged in the Town Hall for the inspection of the subscribers. The committee have selected Messrs. Poulton and Woodman's plan, provisionally on its meeting with the sanction of the police committee, and that it can be carried out for the limited sum (3,500*l.*) in hand. The design presents a Gothic exterior, with a light clock-tower.

*Plymouth.*—Plans, it is said, have been approved of for the better fortification of the entrance to this port, including the erection of a powerful fort on the Breakwater, the inner portion of which, near the centre, will be extended considerably northward.

*Liverpool.*—The Town Council, says the *Albion*, intends to carry a semicircular sweep of boulevards round Liverpool, starting from a point about Bootle, and, after forming the segment of a circle, ending at the Dingle. It is proposed that the boulevards shall be of a uniform width of 100 yards, and there shall be a central carriage-drive of 20 yards, flanked on each side by rows of trees; that beyond the trees shall be roads for pedestrians and equestrians; and the land outside the boulevards shall be available only for villa residences.

*Sheffield.*—The ceremony of laying the first stone of the new Hospital in connection with the Sheffield Dispensary, took place on Monday in last week. The principal part in the ceremony was taken by Earl Fitzwilliam.

*Leeds.*—The foundation-stone of a new Independent School-room has been laid at Sheepscar, near Leeds. The proposed school (which is also to be used as a chapel), will be built upon a plot of ground at the bottom of Barrack-street, adjoining Sheepscar-bridge, and will accommodate about 300 children. In addition to the general school-room there are two class-rooms, and underneath the former building there is an area for a play-ground, but hereafter to be divided into class-rooms. There will also be a play-ground on each side of the school. The building will be erected in the Early Decorative style of architecture. The cost of the school, &c. exclusive of the land, is estimated at 250*l.* and the principal portion of this sum has already been subscribed.

*Stockton.*—The alterations of Stockton-bridge have been commenced. Mr. Knapton, of York, is the contractor, and Mr. William Bulmer, stonemason, Stockton, is sub-contractor for the masonry. The bridge will be widened by a 4-feet path on each side, supported by projecting iron bars on girders springing from the arches. Iron supporters will cross the bridge from side to side, bolted together to give stability to the projecting iron work. The works will cost about 1,200*l.* towards which Stockton contributes 100*l.* and the district of Cleveland a like sum.

*Penrith.*—The following buildings are now in progress in Penrith:—The Church of England Girls' School, or School of Industry; St. George's School (Ragged); New House of Detention, and court-house adjoining, wherein the magistrates will hold their petty sessions.

## TABLE OF LEVELS.

The following Table is compiled from the formula—

$$f = d \,.\, tan\ a,$$

where $f$ is the fall of a piece of ground for the horizontal distance $d$, and $a$ is the inclination of the ground to the horizon.

By reference to this table the amount of fall in any length can be seen for any angle of inclination.

| Value of $a$. | | Fall of Ground for each Value of $a$. | | | |
|---|---|---|---|---|---|
| 1° | ... | 17·5 | in 1,000, or about | | 1 in 57 |
| 2° | ... | 34·9 | „ | „ | 1 in 29 |
| 3° | ... | 52·4 | „ | „ | 1 in 19 |
| 4° | ... | 69·9 | „ | „ | 1 in 14 |
| 5° | ... | 87·5 | „ | „ | 1 in 11½ |
| 10° | ... | 176 | „ | „ | 1 in 6 |
| 15° | ... | 268 | „ | „ | 1 in 3¾ |
| 20° | ... | 364 | „ | „ | 1 in 2¾ |
| 25° | ... | 466 | „ | „ | 1 in 2¼ |
| 30° | ... | 577 | „ | „ | 10 in 17 |
| 35° | ... | 700 | „ | „ | 7 in 10 |
| 40° | ... | 839 | „ | „ | 21 in 25 |
| 45° | ... | 1000 | „ | „ | 1 in 1 |

E. W. Tarn.

## THE TOLL ON CHELSEA-BRIDGE.

After severe and earnest efforts a park has been made for the people at Battersea, but with that ill management which so often renders useless, to a considerable extent, matters of advantage, a toll has been placed upon the bridge leading to this park, which almost closes it to those who have families, and have small means to rear them: such are the persons who most need access to places of this description. Vigorous efforts have been made to remove this tax. It has been stated by good authority that the sale of the surplus land will defray the 80,000*l.* which the bridge over the Thames has cost, and also a considerable amount of the sum expended on the park. The management of such matters in Government hands seems strange. After large majorities against the opening of the Chelsea-bridge leading to the Battersea-park free to foot-passengers, Major Sibthorp seemed to take the House of Commons by surprise, and succeeded in passing the following resolution—"Nor at any time previous to the said sum of 80,000*l.* being paid off as aforesaid, shall any toll be demanded or paid for, or in respect of, foot-passengers passing over or on the said bridge on Sundays." The inhabitants of this district of the metropolis will feel grateful to Major Sibthorp for having been the instrument of doing a certain amount of good. Some holidays were afterwards also exempted.

Considering the great difficulty there is in forming parks where they are really necessary, care should be taken that land which is at present the property of the nation, near large populations, should not be disposed of and rendered unavailable for the purposes of health. Epping Forest has now almost become a suburb of London, and Mr. Hanbury very properly called the attention of her Majesty's Government to this important locality. Mr. Hanbury said he understood that part of the forest which was nearest to the east end of London had been sold within the last twelve months, and that the Crown had disposed of the soil to which he referred, leaving the interest of the lord of the manor confined to the growing timber. Large numbers of persons living at Whitechapel, and the adjacent districts in the east end of London, who were in the habit of going down in vans in the summer season for recreation in the forest, were deprived of that enjoyment. He therefore begged to ask the First Commissioner of Works whether he was aware that some of the Crown rights of Epping Forest which are nearest to London, and most frequented, had been sold by the Government during the last few months, and to call the attention of the House to the importance of securing the yet enclosed portions of Epping Forest for the recreation of the inhabitants of the metropolis.

Mr. Hamilton, in reply, said her Majesty's Government had given notice to the First Commissioner of Works on the subject, and he would make inquiry into the matter.

## NELSON'S MONUMENT.

The idea broached by "Epsilon" closely resembles one long entertained by me, and may also, perhaps, be more artistically correct than mine, which is as follows: Instead of allegorical figures relating to the scenes of Nelson's victories, I would have statues of his lieutenants. At Copenhagen, his next in command was Lord Graves; at the Nile, Lord Saumarez; and at Trafalgar, Lords Collingwood and Northesk. To the penultimate admiral I would assign the post of honour, as I consider him to be the greatest-minded man that the navy has produced since the days of Blake, whom he much resembled, both in self-denying zeal, the circumstances of his death, and ungrateful treatment subsequently. To him, I would give the angle looking down on the official quarter: Lord Northesk's statue could occupy the south-west angle; and Lords Saumarez and Graves the two on the northern side.

I fear that there is no authority for me to quote in support of my proposition, but I cannot imagine that the effect would be inferior to that produced by the contemplated lions. Whether the base be completed with statues of men or animals is of no consequence as regards the figure of our naval hero, as the eye could never take the subjects both of the base and capital. To see Nelson at all, the visitor must stand a hundred yards off at the least (and little he gets for his pains); but to inspect his followers, one must approach near enough to lose sight of the chieftain. Phi.

## NEW CHURCH AT RICHMOND.

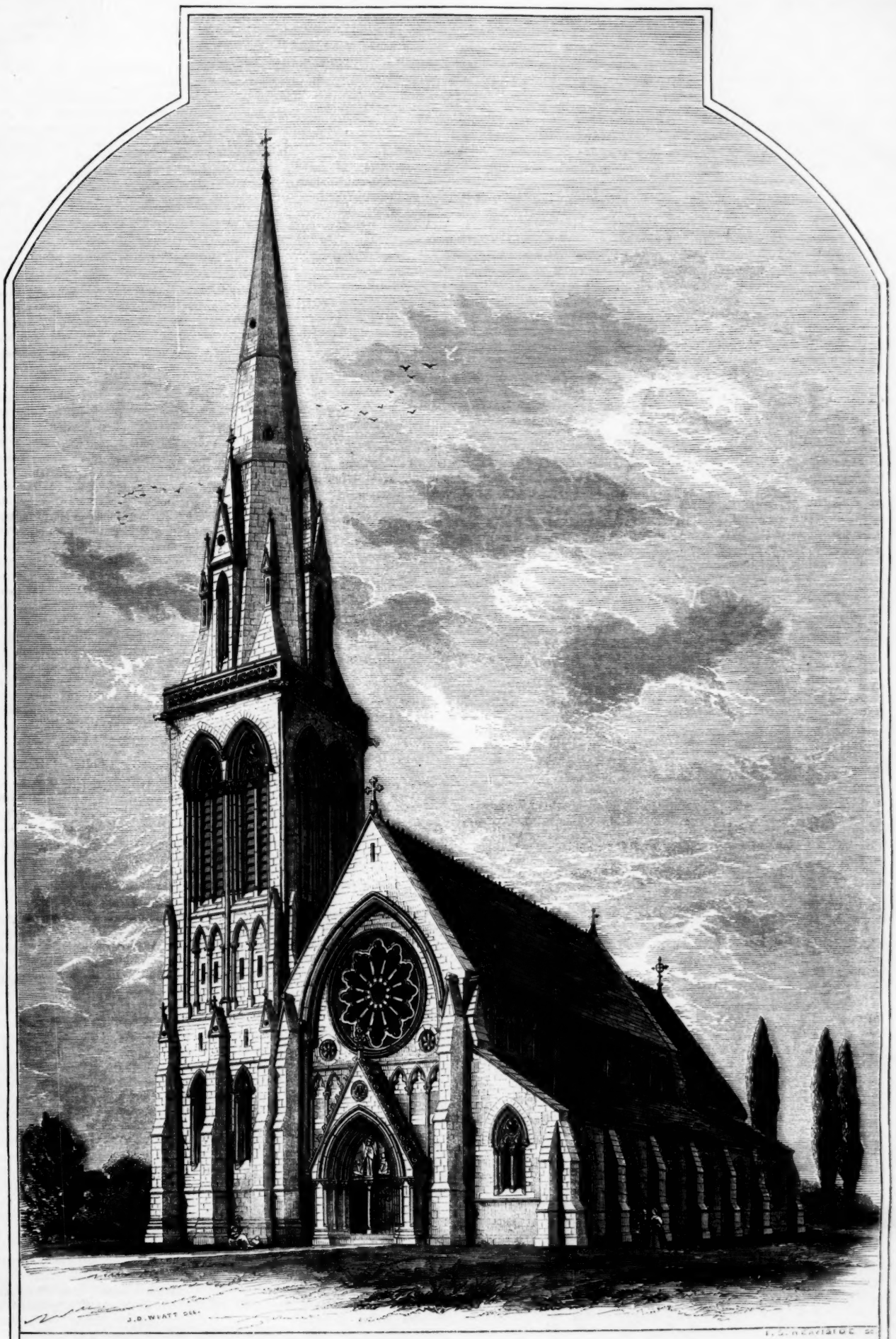
This edifice, erected from the designs of Mr. Scott, was to be consecrated on the 7th instant. The situation is a good one, as it is not as yet hemmed in by buildings; indeed, it is quite in a suburban district, where villa residences are the only intruders.

The style adopted in the new church is the Geometrical Pointed, but it is by no means lavish in ornament, for, with the exception of the west front, the effect of the design depends chiefly upon the boldness of its parts. The plan consists of a well-proportioned nave, separated from the aisle on each side by circular columns, and at the western end of the north aisle is commenced a lofty tower with spire: this, although only roof-high as yet, is expected to be completed without interruption. Beyond the nave is, of course, the chancel, which is 24 feet wide, and finishes in a semicircular end. To the north and south of the chancel are aisles, agreeing with those of the nave, and which are appropriated for a vestry, organ-room, &c.

The general appearance of the exterior will be best understood by reference to the accompanying view, which shows the whole complete. Internally, the sittings are of deal, as is also the roofing: the former are bold in their design. The roof is open, and the way in which the rafters are framed produces a novel look: in the chancel they are all curved, and in the apse meet in a central boss. The pulpit is of oak, upon a stone base: its form is octagonal, and the sides have carved panels. The font is placed near the entrance: it is circular, and comparatively plain. Some of the windows, we observe, are filled with stained glass.

The builders are Messrs. Piper and Son; and the cost, up to the present time, has been about 7,000*l.* We shall have another opportunity to speak of the details.

Arches Falling, on the Striking of Centres.—One method to prevent this (provided the work is good) is to place two moderately tapered wedges under each support; remove them partially, and let them remain for awhile. This simple precaution will save many an arch from falling.—T. G.



THE NEW CHURCH OF ST. MATTHIAS, RICHMOND, SURREY.

Mr. G. G. Scott, Architect.

## CHURCH-BUILDING NEWS.

*Winchester.*—The dean and chapter, it appears are about to restore the entire west front of Winchester cathedral, and workmen are already engaged in the restoration of the porch of the south aisle.

*Clifton.*—It is proposed to erect a new church near Buckingham-villas. A gentleman of Clifton, who has purchased some land in that neighbourhood, has offered to give the site, subject to the following conditions:—That the building shall be sufficiently spacious for a congregation of 800 or 1,000 persons; that the entire area shall be without pews or reserved seats of any description. Should any public expression of opinion be made on this subject, the owner, it is said, will at once hand over the land.

*Chard.*—The old church at Chaffcombe having become very dilapidated, has just been taken down to be rebuilt, and the foundation stone of the new has been laid by Mrs. Vincent, of Chaffcombe-gate. The tower, being sound and good, will not be altered.

*Newnham.*—The foundation stone of a new Wesleyan chapel, according to the *Gloucester Chronicle*, has been laid at Broadoak. Mr. Coleman, of Chaxhill, is the builder.

*Llandaff.*—The following notice of the progress of the work of restoration in Llandaff Cathedral is now in course of circulation, dated from the deanery, Llandaff:—Directions were given to Messrs. Prichard and Seddon to consider and report upon the proper method and order of proceeding; and with their advice contracts have been entered into for the following objects:—1. For the repair of the arcade, 700*l.* 2. For the reconstruction of the clerestory, 950*l.* 3. For rebuilding the walls of the side aisles, and for inserting therein the windows, and constructing the necessary buttresses, 465*l.* 4. For rebuilding a portion of the southern tower, 425*l.* 5. For the timberwork of the roof of the nave, 885*l.* These works are all now in course of execution, and will, it is confidently expected, be completed during the present year: their cost is 3,425*l.*

*Llanmartin.*—The new church erected at Llanmartin was consecrated by the Bishop of Llandaff on the 15th ult. The edifice consists of chancel, vestry, nave, porch, and tower. Underneath the vestry there is a chamber for a heating apparatus. The roof is open and the seats, and there are five stalls in the chancel. The edifice will accommodate about 100. The old monument, which is supposed to belong to the Morgan or Montague family, who once resided at Penycoed Castle, has been preserved and cleared from whitewash. The church has been re-built in accordance with the original style. Mr. Seddon was the architect, and Mr. Williams the builder.

*Aberdare.*—A new church has been opened at Hirwain, in this parish. The design was furnished by Mr. Roose, architect to Lord Bute. The edifice is built of the common stone of the county, with Bath stone dressings. It has a belfry, or spire, at the west end, and is surmounted by Bath stone crosses at each of the gables. The order is German-Gothic. This church has been built by subscription. The ladies of Hirwain, headed by Mrs. Francis Crawshay, have set up a painted window in the east end of the chancel. This window was executed by Mr. Gibbs, and the subject is "The Crucifixion," in the centre light, and St. Paul and St. Peter occupying the other two lights.

*Thornbury.*—The little church of Elberton, about three miles from Thornbury, having become dilapidated by age, it was agreed that the building should be restored and repewed, and the work is progressing. Mr. Norman Brown, mason, of Bristol, and Mr. Grosvenor, carpenter, of Elberton, are the contractors. The costs, including repewing the church, will be upwards of 800*l.* and will be defrayed by Sir Harry Lippincott, of Over Court.

*Hatfield.*—The first stone of a new church has been laid at Lemsford Mills, in the parish of Hatfield. The church is to be dedicated to St. John, and is being erected by the Countess Cowper and her children as a memorial of George, sixth Earl Cowper, in pursuance of a wish often expressed by him. The designs for the church and parsonage-house have been prepared by Mr. D. Brandon, and the building will be carried on by Mr. Foster, of London.

*Warwick.*—A subscription has been commenced for the restoration of the pinnacles of the tower of St. Mary's church, and amongst the names already on the list are those of the Earl of Warwick, Lord Leigh, Lord C. Paulet, and others.

*Walsall.*—St. John's church, at the Pleck, has been consecrated. The Pleck is now a thriving suburb of the borough. The new edifice has been erected almost entirely by voluntary effort. The Lord of the Manor, the Earl of Bradford, in addition to the site, has subscribed 500*l.* The church, which contains sittings for about 600 people, is built in the Gothic style, of the Decorated period. Externally, the walls are of the limestone of the district, with dressings of red sandstone from Codsall, and the fabric is surmounted by a belfry. The stone of Codsall has also been used in the interior as pillars, which have capitals of sculptured foliage. The seat accommodation and the timbers of the roof, which are open, are of red deal, slightly stained and varnished. The architects were Messrs. Griffin and Weller, of Wolverhampton. The oriel window over the altar is of stained glass, the gift of a lady, and represents the Nativity, the Crucifixion, and the emblem of the patron saint of the edifice, St. John. The builder was Mr. Isaac Highway, of Walsall.

*West Smethwick.*—The church of St. Paul, West Smethwick, was consecrated, on Monday before last, by the Bishop of Lichfield. It is in the Early English style, remarkably plain, faced with white bricks, with Bath stone dressings, the roofs covered with slates, in bands of red and green. It consists of nave, north and south transepts, and octagonal chancel, with galleries at the west end, and transepts approached by octagon turrets, and tower, with lofty spire at the north-west angle. The roofs are open-timbered, stained and varnished. The sittings are all open, stained and varnished, of a light shade, giving a pleasing effect to the darker shade of the roof timbers. The windows are glazed with cathedral glass; the chancel with stained glass, presented by Miss Chance. The chancel is paved with encaustic tiles, from the works of Messrs. Maw and Co. The works have been carried out by Mr. Parnell, of Rugby, from the designs of Mr. G. B. Nichols, of the firm of Nichols and Morgan, at a cost of 2,500*l.* giving accommodation for 800 adults and 150 children.

*West Bromwich.*—The new church dedicated to St. Peter, recently erected at Greet's-green, West Bromwich, has been consecrated. The architecture of the new edifice, according to the *Birmingham Journal*, is Early English, very plain, but massive. It contains 834 sittings, and has cost in its erection 4,000*l.* The architect was Mr. Johnson, of Lichfield; and the builder, Mr. Robinson, of Reddich. A considerable sum is yet owing on the building.

*Altrincham.*—Considerable progress has been made in the demolition of the walls of the old fabric of Bowden parish church. A portion of the north wall near the tower had been renovated within a comparatively recent period, and is consequently kept standing; but the *Manchester Courier* fears that this will be penny wise and pound foolish. The tower at present remains intact, it being the intention to build it up higher on the old walls.

*Blackburn.*—At a meeting held in St. Peter's church, Mr. W. Stones exhibited plans of proposed alterations in the galleries, and in the area of the church. By the proposed alterations there would be 800 sittings in pews, 500 free seats, and 468 seats for children, making a total of 1,848. It is also proposed that the church shall be heated with hot-water pipes, and lighted with gas. The edifice is also to be re-painted and thoroughly cleansed, the total cost of which is estimated at 1,000*l.* The owners of the pews in the galleries are to be consulted, and they will be canvassed for subscriptions.——Resolutions have been unanimously passed by the congregation of St. Anne's chapel for the accommodation of about 200 more persons in that edifice by the erection of a new transept and chancel. The proposed extensions will cost about 300*l.*

*Walton-le-Dale.*—Two stained glass windows have been placed in the church at Walton-le-Dale, near Preston, in memory of the Rev. John Brooks, late rector of the parish. The money has been subscribed by the parishioners, most of it in small sums. The glass is by Mr. Wailes, of Newcastle-upon-Tyne. In one window are subjects typical of the Sacrament of Baptism, in the other of the Lord's Supper.

*Greetland (near Halifax).*—A fair prospect is presented for the erection of a new church in this rapidly rising district. Greetland forms part of the extensive township of Elland-cum-Greetland, and only one church exists in it, and that is the very ancient church at Elland. About 1,000*l.* have been promised towards the erection, and ecclesiastical grants to the amount of about 900*l.* are talked of.

*Martham.*—The church of the village of Martham, in Norfolk, is being restored, at the expense of Mrs. Dawson, daughter of the vicar. Most of the restorations are being carried out so as to approximate to the original style of the erection. The expense hitherto has been several thousands of pounds. The cusped chancel arch is enriched with foliage and two corbels, with angels bearing the sacramental emblems, the paten and chalice. The hammer-beam roof is decorated with angels and enriched with spandrils; while the arches are in the Perpendicular style, and surmounting them, either in the roof or on the arches, are various emblems representing "The Passion," and other Scriptural subjects. As the entrance to the chancel is in the Decorated style, that portion of the edifice which is not yet commenced will also be decorated. Peake's Staffordshire tiles, laid in variegated patterns, form the pavement of the passages. The east window is to be filled in with stained glass. The tower is to be restored by the parishioners.

*Wigan.*—The foundation-stone of a new Wesleyan chapel has been laid on Lamberhead-green, near Wigan. The building is to be Gothic, with a clock tower on the south side, and is to accommodate 500. The cost, including the day and Sunday school in course of erection, will be 2,600*l.*, towards which Government have granted 684*l.*, and Mr. Atherton, M.P. has given 200 guineas. Nearly 2,000*l.* have been already raised.

*Morpeth.*—The Presbyterians of Morpeth (under the pastoral charge of the Rev. James Anderson) having determined upon the erection of a new church, invited Mr. Matthew Thompson and Messrs. Oliver and Lamb, architects, to send designs in competition for the same, when those of Mr. Thompson were chosen, and the works are to be proceeded with under his superintendence.

*Newcastle-upon-Tyne.*—St. Nicholas' cemetery, situated at North Elswick, between the Union Workhouse and the edge of the Town Moor, and consisting of six acres of land, purchased from the Board of Guardians, is now finished and ready for burials. It is completely walled round, having two entrance gates—one towards the north turnpike, and the other towards Elswick. Just within the latter are two chapels, of Gothic architecture, separated by the keeper's residence, &c. The grounds have been laid out in walks, and planted with trees, shrubs, and flowers.

*Hexham.*—The abbey church in this ancient town is about to undergo restoration at the hands of Mr. Salvin. The present modern galleries are to be cleared away, the mutilation of the choir piers caused by them to be repaired, and the ancient stalls placed in new positions farther to the east. The east end was altered and almost wholly renewed about thirty years ago, and as it is what might be expected from the limited knowledge of that period, it will now be rebuilt. The Lady Chapel, which has been in a ruinous state for a considerable time, will be removed altogether, but a memento of it will, in all probability, be preserved in a work on the church which has been undertaken by Messrs. Haswell and Johnson, architects, of North Shields. Part of the restoration, we understand, will be effected by means of subscriptions, and the remainder through Mr. Beaumont, M.P. the lay rector.

*Mountblairy.*—The private burial place provided by Mr. Morison, of Bognie, on his estate at Mountblairy, was consecrated by the Right Rev. Dr. Suther, bishop of Aberdeen, on the 7th ult. It consists, says the *Banffshire Journal*, of a large vault, over which has been built a small Gothic edifice, from designs by Mr. Wm. Ramage, of Aberdeen, architect. It is large enough to be at any time converted into a private chapel, but at present it is unfurnished, and has not been dedicated to this use. It is situated about three quarters of a mile from the mansion-house, not far from the river side, on sloping ground, inclosed and tastefully laid out. No wood is used about the building, except in the door inserted in the east end, in a doorway ornamented by pilasters and rolls of fluted work. The walls are surrounded by buttresses of Morayshire stone, of which material the whole of the dressed work is composed. At the south-west corner is a circular column, surrounded by a crocketed pinnacle, giving it the appearance of a miniature tower. Carved crosses adorn both east and west gables. The roof is supported by stone ribs, pierced. Instead of slates, immense Forfarshire slabs are used in three tiers. There is a window, in keeping with the building, in the west end, filled with stained glass, and a small trefoil over the door. The walls, internally, are covered with Roman cement, and ornamented on both sides with scrolls and shields, inscribed with suitable texts.

---

ANTWERP BOURSE.—We hear with regret of the destruction of this interesting building, the type of our first 'Change.

## THE "PUBLIC HEALTH ACT" IN ROTHERHAM AND WORKSOP.

Sir,—At Worksop, where a large sum has been expended in *law*, little or no sanitary improvement has been carried out, unless the making of a brick culvert down the Carlton-road, which empties itself into the Chesterfield Canal, can be called such a work; and this has been the subject of a contest with the Manchester, Sheffield, and Lincolnshire Railway Company, (to which company such canal belongs), in the Court of Chancery; the result of which has been, that the Worksop Board of Health has been obliged to cut off all house drainage from the aforesaid sewers, so that merely surface drainage, or rain-water, now flows into the canal. How any sane men could carry out such a work, and call themselves a Board of Health, I cannot imagine: to turn sewage into a canal, where it must necessarily lie stagnant, fostering and spreading miasma and disease along its banks, as the filth is stirred up by the traffic of the boats—instead of the cognomen of the "Board of Health" being applicable to them, it should rather be called a Board of *Disease!*

A memorial was presented to the Local Board some time ago, to request them to dismiss their staff, and resolve themselves into a new Highway Board. So these sagacious men have the presumption to imagine, that they can give the Public Health Act the go-by; and, it seems, carry out only so many Acts of the Legislature as suits their pleasure or caprice. Do, Mr. Editor, enlighten a few of these obstreperous and refractory Boards; convince them, if you can, that Acts that are passed for the benefit of the masses are not to be subverted or construed for the benefit of the few, and in most instances those few that ought to have the least forbearance shown them, namely—the owners of cottage property, who exact a large, and, in most instances, an enormous rent from their poor tenants, without giving them the *quid pro quo*, in the shape of well-built houses, thoroughly drained and supplied with water. This is the self-interested source from whence springs all the opposition to the Public Health Act, and one that requires the serious attention of the Legislature.

If, with the laudable example set them by her Majesty, his Royal Highness Prince Albert, the Duke of Bedford, and others of our eminent, enlightened, and philanthropic aristocracy and gentry, these obstinate men cannot be induced to do their duty to their poor tenants, then, I say, it becomes a question that ought to be taken up by the Legislature; and what is now a crying evil, a deadly wrong, may be amended, and the dirty "borough interest" swept clean with the besom of reform.

The water supply of Rotherham is derived from wells and springs, some of them in one of the streets: so in the very first act of this Board they violate one of the general principles laid down by the General Board, that wells or springs within a town are not proper sources of supply for the inhabitants, as they are liable to be impregnated with drainage and other matter injurious to health. And if we are to judge of the health of that place by the Registrar-general's Return, it is evident that the works of the Board of Health have had a tendency to increase its mortality, which is at variance with the intentions of the Legislature, and contrary to the spirit and preamble of the Act "To amend the Public Health," &c.

The first act of the Local Board was to purchase the old waterworks and plant situated within the town, for the goodly sum of 2,464*l.*; and, having purchased that interest rather dearly, they proceed to lay out a new scheme for the supply of the town. After examining various sources of supply,—more eligible I think—they revert to the old sources, although the quantity of the water stated the works would yield was 180,000 gallons daily; and after the drainage works had been carried out, where the pipes of water and sewage run a considerable distance parallel with each other, *some of the water pipes being perforated*, the quantity fell off to less than 100,000 gallons, so that upwards of 80,000 gallons were lost by the springs being injudiciously tapped when the sewage works were carried out. Borings were made, to see if an increased supply could be obtained from other parts, and either from that failing or the money that had been borrowed (34,000*l.*) running short, the scheme for a time was abandoned. The estimated supply of water for Rotherham was 600,000 gallons per day, and engines in duplicate of forty-horse power each were erected, and mains laid for this large supply, and for the first twelve months not *one-sixth* of that quantity had been realized. A great deal of money has been spent in building an ornamental engine-house of mediæval character, and a huge, top-heavy, disproportioned chimney, the cost of which I believe was about 460*l.*; so the rate-payers cannot say they have not something to show for their money, if they have little or no water. Subsequently other springs were collected in the Wellgate Valley, that are now said to produce 100,000 gallons daily, making something like 200,000 gallons; and this supply is intended for about 2,000 houses (the number stated to be laid on); but either this quantity must be exaggerated, or there must be great waste, that it should be rendered necessary to distribute so extensive a supply. It will rather astonish you, Mr. Editor, when I state that these extensive and hitherto unsuccessful works have cost upwards of 26,000*l.*, so that for the supply of 2,000 houses (which is not likely at present to be greatly increased) to distribute less than 200,000 gallons of water daily, these costly and extravagant works have been carried out. The increased supply of the Wellgate Valley is rather of a questionable character: it collects, I believe, a great deal of surface water, as well as the springs, which they profess to filter; but the filter is of such a character as would excite the risible faculties of hydraulic engineers. It is a small filter, 4 feet square, and the water filters down on one side and up on the other, the division being made with a flag-stone (like an old-fashioned street trap), and this filtering medium is never changed. This is the foolish thing the simple men have made to filter 100,000 gallons of water daily, and they lay the flattering unction to their souls that it is perfectly successful. But it is evident from what I hear that diarrhœa and fever are prevalent at frequent periods, which has been traced, no doubt most correctly, to the impurity of the source of the supply of water. The inhabitants generally complain that the quality of the water is not so good as it used to be formerly from the wells.

They have three reservoirs,—one at the pumping station, capable of holding 200,000 gallons when full; another at Boston, holding 600,000 gallons; and another at Kimberworth, of 37,500 gallons. These reservoirs are so badly constructed that they leak; and, if they had a sufficient quantity of water to fill them, they could not be used to the full extent on that account. They have attempted to make them water-tight by rendering them over inside with cement.

One peculiarity attending the Rotherham works is, although the Public Health Act provides that water-closets shall be erected to every house, they have hitherto avoided or evaded this wholesome provision of the Act, and water-closets in that pseudo-drained place are the exception, not the rule. In fact, instead of having water-closets erected to new houses, they are perpetuating that barbarous and unhealthy practice of erecting privies to each house, which, in comparison with the former system of having one to five or six houses, is absolutely increasing those horrid nuisances of cesspools five or six fold. So much for the Public Health Act, as administered by some of those eccentric and irresponsible Boards, the Local Boards of Health.

Rotherham, although it has no outfall except the River Don, has not committed the egregious error of Worksop, by carrying the sewage into the canal, but has conveyed it a short distance down the river below the town; but this is complained of as a nuisance by an owner of landed property, who has threatened to bring an action against the Board in consequence; and the result will be, no doubt, that the Board will be compelled to erect works to deodorize the sewage. The works are a combined system of brick sewers and pipe drains, pipes considerably predominating. They have three outlets, two in Rotherham and one in Masborough: the second outfall on the Rotherham side was an evident oversight, as one judiciously laid out ought to have sufficed.

The inclination of many of the sewers is very defective: in one instance, a pipe sewer has only a fall of 1 in 578, and no system of flushing adopted. How they are to expect pipe sewers to act with such a fall I am at a loss to imagine, but many of these good easy souls fancy they will. If we are to judge by the lengthened experience of London and other places, they will be doomed to bitter disappointment.

The cost of the sewerage works of Rotherham amounts to 7,991*l.* 4s. 3d.; the waterworks, 24,438*l.* 15s. 6d.; engineering expenses, 1,660*l.* 18s. 4d.; clerk of works, &c. 343*l.* 13s.; survey, &c. 492*l.* 14s. 3d.; and other expenses, making the total of 39,700*l.* 11s. 3d. an amount of expenditure I will venture to say unparalleled in any sanitary works carried out in this country for so small a place. The preliminary estimates for these works (see report) were, for the waterworks, 9,843*l.* including service pipes and taps to houses (which have been paid for by the owners of property as a separate and distinct charge); and for the sewers, 4,521*l.*; the house-drainage works, 4,645*l.*; making a total for public waterworks and sewers, of 14,364*l.* and showing an excess of expenditure over the estimate of 25,336*l.* 11s. 3d. or nearly 200 per cent.

An Old Correspondent.

## KENT ARCHÆOLOGICAL ASSOCIATION.

On Friday in last week the first annual meeting of this Association was held in Canterbury, under favourable circumstances. The opening meeting, for the election of members and the reading of the report, took place at the Guildhall, under the presidency of the Marquis Camden.

A number of Saxon relics of an interesting character were exhibited.

The president, on taking the chair, read letters of excuse from various gentlemen; and the hon. secretary (the Rev. L. B. Larking) then read the report, of which the following is an abstract:—

Three months only having elapsed since the last general meeting, there must necessarily be very little to report of the society's proceedings; yet the report, such as it is, is indicative of successful progress. The South Kensington Architectural Museum, and the Kilkenny Archæological Society have been taken into union. We have at present the names of forty-one candidates for admission on our books. Should they be elected, the numbers will then have reached 600, all elected in less than a single year. With regard to our funds, we have 212*l.* 2s. 10d. New Three per Cent. Annuities, and our bankers' books show a balance of 140*l.* The printer is fast progressing with our first volume, which we hope to have ready for delivery in a very few weeks. Contributions to the amount of 60*l.* have been made to the fund for providing illustrations for the volume.

The President announced eighteen papers which had been communicated, but time only allowed one to be read, viz. that by Mr. C. R. Smith, on "Saxon Relics recently discovered at Faversham," when, after a vote of thanks to the president, the meeting adjourned to the cathedral, where Professor Stanley, followed by at least 500 listeners, gave an exposition of its various historical reminiscences.

At the close, Mr. Beresford Hope, M.P. performed the same kindly office to the audience at St. Augustine's.

St. Martin's Church, the city walls, gates, castle, and the Pilgrims' Inn were also visited.

The members met at dinner, provided by Mr. Usher, at the Music Hall, when 300 were accommodated.

In the evening a *réunion* took place.

## ANCIENT AND MODERN FINE-ART EXHIBITION.

### IRISH INSTITUTION, DUBLIN.

We have the pleasure of noticing the fifth annual exhibition of this institution, which many of our readers are aware was founded in 1853, with a view of securing a collection of pictures for, and promoting the establishment of, a National Gallery for Ireland. It is, however, to be regretted that the apartments at the command of the committee are not of a more comprehensive character than those in their building in Baggot-street, as the limited space must certainly militate against the financial interests of the undertaking. If, however, we may judge from the recent promise of the Chancellor of the Exchequer, that 5,000*l.* should be passed into the supplemental estimates for the erection of the proposed building on Leinster-lawn, we presume that its purposes are but temporary, and that within a reasonable time we shall see an extensive and beautiful collection of works of art appropriately housed in a permanent building, serving as a corresponding wing to the new Museum of the Royal Dublin Society. We hear that independent of the sum above alluded to, as also the previous Parliamentary grants of 6,000*l.* and the 5,000*l.* collected for the Dargan Fund, donations to an extent of about 900*l.* have been received towards the purchase of works of art. The present exhibition is in every way worthy of the objects in view; and considering the collection at the Royal Hibernian Academy, also open, illustrates a fact, that Ireland, in matters of art, sustains her position creditably. There are about 150 pictures displayed, some of them the property of the institution; others lent by the proprietors. Amongst the works of ancient artists we find the productions of A. Caracci, Rembrandt, Rubens, &c. The "Three Marys"

of the former, and the "Lion-hunt" of the latter, deserve special admiration. "The Jewish Rabbi," by Rembrandt; "Landscape with Cattle," by Rosa de Tivoli; "The Mountain Torrent," by Everdinger; "The Horse Fair," by Tschaggeny; and "Sportsmen returning from the Chase," by Herrara, are amongst the other principal objects of attraction. The pictures by O'Connor, Newton, Bossuet, Zuccherelli, Canaletti, J. De Baan, Muttoni, &c. &c. deserve particular notice.

## NOTES IN IRELAND.

A NEW school-house of unpretending character is being erected at Mecklenburgh-street, Dublin.

A line of railway from Clonmel to Dungarvan is projected.

The new iron-bridge, conveying the Limerick and Ennis Railway across the Shannon, has been tested by Colonel Yolland, Government inspector, who not being satisfied at the lateral rigidity of the structure, the contractor, Mr. Kinnaird, at once undertook to add more piles. The work will be completed in about a week.

The Irish railway companies seem to be peculiarly liberal this summer, in providing excursion trains. Trips from Dublin to Galway and back, for 7s. 6d.; to Belfast and back, for 6s.; to Carlow and Kilkenny and back, for 3s.; and to Waterford and back, for 4s. 6d. have been announced.

The church of Clones, county Monaghan, is to be enlarged.

A new chancel in the Gothic style, and from the designs of the architect to Ecclesiastical Commissioners, has been added to the parish church at Kells.

The new church of Ballylongford, erected after designs by Mr. Nagle, C.E. of Limerick, was recently struck by lightning, and the roof seriously damaged.

The new Catholic Church at Ballinasloe is to be consecrated on the 25th August. Cardinal Wiseman is to attend.

It is in contemplation to erect a new church at Bray, county Wicklow, the present one being found inadequate to the accommodation of the congregation; and the school-house being used as an auxiliary place of worship. A new Presbyterian church has been recently commenced; Mr. Barre, architect.

Two new fifty troop-horse stables, and one infirmary ditto, are to be built at the temporary barracks on the Curragh of Kildare.

It is proposed to construct a new pier and breakwater for Galway harbour, at an estimated cost of 150,000*l*. The Lord Lieutenant has signified his intention of recommending the Government to render every assistance.

The new Catholic Church of St. Mary's, Athlone, is rapidly approaching completion. Mr. John Burke is the architect.

We hear of a new Roman Catholic Church being intended to be built at Headford, in the county Mayo. The service is now being performed in a barn 18 feet by 13 feet.

The construction of the Tullamore and Athlone Railway is being proceeded with rapidly. The rails for one track have been laid down for some miles near the town. Mr. Dargan, contractor.

Harbours of refuge at Portrush, Carlingford, and Waterford, are projected.

New police barracks, offices, &c. are to be built at Kill, near Naas.

The church of Mucknoe, Castleblaney, is to be rebuilt; the churches of St. Luke, city of Cork, and Bective, county Meath, are to be enlarged; and sundry works are to be executed at the church of Toomna, county Roscommon, all according to designs by the architect to the Ecclesiastical Commissioners.

## THE PURIFICATION OF THE TAME.

### INJUNCTION TO RESTRAIN THE BIRMINGHAM CORPORATION FROM INTRODUCING SEWAGE INTO THE RIVER.

SHORTLY after the passing of the Birmingham Improvement Act (1851) the council of the borough, in pursuance of the powers given to them by that Act, proceeded to construct a new system of sewerage for the town; and in 1854 completed a large main sewer, which discharged the sewage of the whole town and its vicinity, in a single stream, into the river Tame, the previous drainage having been effected by means of various small sewers flowing into a stream called the Rea, which falls into the Tame at a short distance below Birmingham.

At a distance of some seven miles below the junction of the Rea and the Tame, the estates of the informant, the Right. Hon. C. B. Adderley, extended on both sides of the Tame for about three and a half miles. In consequence of the discharge of the sewage of Birmingham into the Tame from the new main sewer, the river, which, under the previous system, had not been perceptibly affected, had become so foul and polluted that the fish had all died, cattle would no longer drink, and the houses on its banks became unhealthy, even at the distance at which the plaintiff's property was situated, while in the immediate neighbourhood of the town some fatal cases of diphtheria had occurred at a mill on the banks of the river.

In October, 1854, the plaintiff, together with certain noblemen and gentlemen, also riverain proprietors, joined in a memorial to the town-council of Birmingham, remonstrating on the state to which the Tame had been reduced, and calling upon them to take immediate steps towards purifying the river and abating the nuisance. In answer to this memorial it was stated that a new system of sewers was being constructed, and that it was intended to deodorize the sewage and render it available for agricultural purposes, so that the fluid would pass into the river in a comparatively pure state. Mr. Adderley was induced to believe from this answer that some efficient steps would be taken; but, after some correspondence and negotiation, which had not resulted in any definite course of action, the nuisance, instead of being mitigated, had continued to increase. Under these circumstances, an information had been filed at the instance of Mr. Adderley, for the purpose of restraining the town-council from causing or permitting the sewage of the town to drain into the river so as to pollute it, or become a nuisance or injurious to public health.

After the hearing of the cause, in the Vice-Chancellor's Court, Vice-Chancellor Wood said, it had been contended that he had to balance the health of the 250,000 inhabitants of Birmingham as against the legal rights of the plaintiff, a single individual. As to the right, however, of any individual to be protected against an infringement of the law, and as to the equitable discretion of this Court to interfere at all, it was a matter of the utmost indifference whether 250,000 or only one individual was concerned. The rights of Mr. Adderley were to be measured according to the provisions of the Legislature, nor did this Court sit as a Committee of Public Safety, but simply to interpret what had been prescribed by the Legislature for the town of Birmingham, and to give neither more nor less on either side. The plaintiff was clearly entitled to this,—that the river, which formerly passed through his property unpolluted to such an extent that fish would live in and cattle would drink of it, should be left in the same condition. He was entitled to all the use, enjoyment, and benefit of the river that he had formerly had, unless there was something in the Birmingham Act to limit that right. If they could not drain the town without polluting the river and infringing Mr. Adderley's legal rights, let them go to Parliament for power to enable them to commit the nuisance. It was said that the inhabitants had a right to drain the town into the river, and that this right had been always exercised. But under this right, as formerly exercised, the river did not become unfit for use. Cause and effect were clearly shown in this as in the Luton case. The nuisance was not perceived until the whole sewage was poured into the stream in an undiluted form through one outfall, whereas it had come before by driblets through various channels. The defendants were compelled by the Legislature to drain their town, and it was their business to find out how it was to be done properly: if they did not, the Court would do so by stopping it altogether!

## WORKMEN AND TOBACCO.

SIR,—It is remarked that, according to a parliamentary report recently received, the duty on tobacco for one year, in the United Kingdom, amounts to 5,201,104*l*. In London alone the receipt was 2,171,665*l*.

If the duty amounts to the above enormous sum, the amount paid for tobacco must be enormous.

It is curious to remark that London, which contains about a tenth part of the population, consumes nearly one-half of the quantity used by the whole kingdom. The sum (even of the interest) consumed by the smoking of this weed in three years, would be more than sufficient to take the drainage of London to the sea. What famous hospitals and schools might be raised by the cost of the tobacco used in the metropolis in one year? However, people will have their smoke, and yet, notwithstanding the praises of Byron, Charles Lamb, and others, I cannot help feeling something in the vein of King James at the time of writing his famous counterblast, when I see the great increase of the use of the weed amongst the young. In bad neighbourhoods, the rising rough of ten years of age may be seen gravely smoking his pipe; and in the early morning young workmen, from fourteen to sixteen years of age, may be seen taking their pipes with all the vigour of manhood. Admitting that the use of tobacco may be harmless when used in moderation, I cannot but look with dread at its effects on the youth of England; and if the same increase continues, it will not be a matter of surprise to see our school-boys looking upon the tobacco-pipe to be as necessary as the slate-pencil.

A LONDON WAYFARER.

## RECENT PATENTS.*

B. SHAW, Wellington, Shropshire. — *Windows.* Dated December 8, 1857.—This invention consists in fixing a window upon an axis, or upon centres, in such a manner that the window, on being made to perform a semi-revolution upon the axis or centres, will present to the inside of the room the side which was previously outside.

H. WETHERELL.—*Patent Apparatus for preventing Down-Draughts in Chimneys.*—Mr. H. Wetherell, of Upper Chapman-street, St. George's East, fits a seat in metal, or other suitable material, at any desired height in a chimney or flue, and above the seat suspends a ball filled with some gas lighter than atmospheric air. The ball offers no impediment to the passage upwards of smoke, vitiated air, or any other ascending current; but any descending current is effectually stopped by the valve, which is thereby forced down on to its seat.

T. MACAULEY. — *Improvements in Apparatus for Condensing the Noxious Vapours arising from Varnish making and other like Manufactures.*—In one arrangement of the melting or running pots, a close-fitting lid is required, in the centre of which is an aperture coned inwards, through which passes the stirrer. The cone has at bottom a plug, moveable upwards out of its socket. In the top of the lid is also fitted a trial or gauge aperture, having a socket and a perforated plug, through which passes, and to which is fixed, the gauge rod terminating in a small basket or short cupped tube. The lid and head are furnished with inner channels to convey off condensed vapour, and the lid has an aperture to which is connected a wide bent tube supplied with a socket; so that it can be attached to a refrigeratory worm, set in a water vessel, and the liquid resulting from the condensed vapour in the refrigerator can run from it into a common receiver.

W. E. NEWTON. — *Improved Machinery for Cutting Files.* (A communication.) Dated Aug. 13, 1857.—This consists—1st, in constructing and operating the bed on which the file is cut so as to have a forward feed motion, and at the time of the blow of the hammer a slightly independent forward motion of the upper half of a compound bed (or united bed, as the case may be) caused by the percussion of the hammer on the chisel, in upsetting the burr or teeth of the file against the back edge of the chisel, in consequence of its angle of cut wedging it forward at the time of cutting the teeth in the file blank, and the difference of resisting surfaces of metal. 2. In constructing and operating the cutter or chisel holder and stock, so as to cause the chisel to find its own level upon the file blank at all times under the stroke of the hammer, so as to make the cut uniformly across the face of the blank. 3. In actuating the hammer by cams, the hammer shaft being provided with a regulator, ratchet wheels, and springs, whereby the force of the hammer may be varied at pleasure. 4. In effecting the feed motion by an intermittent worm on the main driving shaft operating on a male and female screw or rack and pinion, for working an inclined plane, whereby the bed on which the file blank is cut is moved forward. 5. In a mode of operating the inclined plane. 6. In a mode of constructing the tang holder.

CHARLES WESTENDARP, Jun. Mincing-lane.—*Preparing a Material as a Substitute for Ivory, which he proposes calling Artificial Ivory.* Dated 9th December, 1857.—The patentee takes a quantity of small particles of ivory, bone, wood, glass, cotton, wool, or any other similar articles, either in a coarse or fine powder, or in shavings, according to the imitation which is intended, and combines them, or any of them, according to the purpose required, with gums or other resinous ma-

* Selected from the condensed lists published in the *Engineer* and the *Mechanics' Magazine*.

terials, such as gum dammar, gum copal, resin gum shellac, gum sandrac, wax, or other glutinous or resinous materials, using which of the said gums he may see fit for the purpose the material is required for. These ingredients he combines by pressure or heat, or both, or with spirit, oils, or any similar vehicle or solvent, forming a mixture of the whole or any of them by mollifying, dissolving, or compressing the said small particles with the said glutinous or resinous materials, thereby producing a substance of an ivory or wood-like appearance, which may be coloured, dyed, or stained during the process of manufacture, or afterwards. By the combination of the articles aforesaid a paste will be obtained, which may be immediately moulded and become solidified in a short space of time by means of heat or pressure, or both, or it may be so manufactured as to remain in a pasty condition for a considerable time, in order to allow it to be carried to any distance or worked into any form; for instance, such as decorating in buildings for mouldings, scrolls, or similar ornamental work, the drying materials being added at pleasure, according to the requirements of the work which is being performed.

Samuel Barlow Wright and Henry Thomas Green, Rugby.—*Apparatus used in the Manufacture of Bricks, Pipes, and Tiles.* Dated, 27th of November, 1857.—This invention has for its object improvements in those classes of machines used in the manufacture of bricks, pipes, and tiles, where clay in a plastic state is expressed through orifices of a pug-mill, or other expressive machinery, and consists, first, in an improved manner of driving and regulating the speed of the cutter which cuts the clay into lengths. Second: in an improved instrument for dividing a stream of clay from a pug-mill, or other expressive machinery, into lengths.

Joseph Eccles, Blackburn, Lancashire.—*Drying and Colouring, or Ornamenting Bricks, &c.* Dated, 2nd December, 1857.—These improvements relate, Firstly, to drying bricks, tiles, pipes, and other articles, preparatory to burning. Secondly: to colouring or ornamenting bricks, tiles, pipes, and other articles made of plastic earths.

Riggs.—*Patent Improvements in Preparing, Sawing, Planing, and Grooving Wood, &c.*—Messrs. A. Rigg, sen. and A. Rigg, jun. of Chester, have patented the following: For preparing wood for purposes where dry and well-seasoned timber is required, close chambers are formed, and provision made so that the wood may be arranged with open spaces between the pieces: one or more inlets and outlets are provided in these chambers for the admission and exit of steam or heated air, which are to be admitted alternately or together. They prefer the admission of them alternately, so that, after the timber has been partially dried, they expose it to an atmosphere of steam, and then to currents of heated air, caused to enter by a fan or other means. It is well known that timber dried when exposed to the alternate action of wind with heat and showers, is most valued: the patentees by this mode of action adopt as nearly as may be a similar process. In the case of some timber it may be desirable to utilize the product by the condensation of such of the volatile products as may be extracted. In such cases they arrange any ordinary means for the condensation of the vapours as they pass out from the chamber.

George Walker Muir, Manchester.—*Warming and Ventilating.* Dated 13th January, 1858.—These improvements relate—first, to forming the pipes through which hot water is made to circulate with flanges; secondly, to constructing ventilators or ventilating shafts in such a manner that inward and outward currents are produced and maintained. Adaptations of the invention are applicable when what are known as sunlights are used.

---

Runcorn Cemetery Competition.—The Burial Board have received designs from 35 architects for the building. The Board, after consideration, thought that five plans deserved to stand upon their merits after personal interviews with the respective architects. These gentlemen, accordingly, attended the Board, viz.—Mr. E. Trevor Owen, Liverpool; Messrs. Pritchett and Sons, Sunderland; Mr. William Gay, Bradford; Mr. Thomas D. Barry, Liverpool, Mr. Henry Fuller, Manchester: and after inquiry the Board awarded the first prize, 30*l.* to Mr. T. D. Barry, whose plans they adopted; and the second prize, 10*l.* to Mr. William Gay.

## Miscellanea.

Mahogany Ships.—In consequence of the increasing scarcity of good oak timber for shipbuilding, the use of Honduras mahogany as a substitute has lately very much increased, both in England and other parts of Europe. M. Arman, the well-known shipbuilder at Bordeaux, last year made some experiments to ascertain the strength of mahogany as compared with French oak and teak. A piece of each kind of wood, about 4 inches square, was placed across the machine used for proving chain cable, and a piece of chain was attached to a ring fixed in the centre of it. A strain being laid on, the oak broke under a force of 1,800 kilogrammes; the teak with that of 3,300; and the Honduras mahogany of 3,400. The oak and teak appeared as if crushed, but without a complete disjunction of the fibres: the mahogany showed long splinters, indicating a much longer grain or fibre than the others. M. Arman considers this result as a conclusive proof that mahogany is superior for many kinds of shipbuilding purposes, though it is less flexible than good French oak. MM. le Mire and Son, builders at Rouen, give the result of using mahogany in a vessel which they had built, the *Adèle*, just returned from a long voyage. The captain, in a letter to the builders, gives a most satisfactory account of the state of the vessel, and expresses his decided opinion that the use of oak in shipbuilding may be advantageously replaced by mahogany.

Artificial Stone.—A new combination of mineral substances for the production of artificial stone has been provisionally specified by Mr. F. Puls, of Haverstock-hill. The invention has reference to the production of artificial stone for ornamental and other purposes, and consists in the combination of powdered emery, flint glass, ruby, diamond, melted alumina, oxide of iron, or similar hard mineral substances, with proportionate quantities of lime, barytes, plaster of Paris, or chalk, and silicate of potash or soda, or potash and soda powdered in solution, or in a semi-fluid state. For the production of stone for lithographic or ornamental purposes, he combines lime or chalk powder with silicate of potash or soda, or otherwise, to which colouring matter may be added as required; and for meerschaum mixes carbonate of magnesia or oxide of magnesia, or a mixture of both, with silicate of potash, soda, or otherwise, to which may be added small proportions of slaked lime, chalk, or clay. Either of the above compositions may be pressed into moulds, warm or cold, to give it the required shape, and render it close and compact.

The United Society of Ironmongers.—The annual dinner of the members and friends of this society was held on Wednesday in last week at the Freemasons' Tavern, Great Queen-street, Lincoln's-inn-fields. Between seventy and eighty sat down to the repast, with Mr. W. Gould, of the firm of Miles, Gould, and Co. of London, in the chair, supported by Mr. H. E. Hoole, of Sheffield, as Vice-Chairman. Mr. S. Crowther, from the firm of Messrs. R. W. Kennard and Co. addressed the meeting, amongst other speakers, and stated that the society is now in the thirty-fourth year of its existence, during which the yearly receipts have risen from 65*l.* to between 300*l.* and 400*l.* It was very desirable, however, he remarked, to sustain the vigour of the society by an accession of young members. The donations received at the meeting, independently of annual subscriptions, amounted to about 20*l.*

The Westminster Palace Hotel.—The excavations are now being made for the foundation of the Westminster Palace Hotel, on the triangular plot of ground at the end of Victoria-street nearest the Houses of Parliament, and bounded on one side by the new thoroughfare, and on the other by Tothill-street. Some human remains were found by the workmen while digging in the centre of the ground where formerly stood some very old structures, which constituted a part of a district notorious for ages as the abode of thieves, highway robbers, and the very lowest courtezans. The workmen have received instructions to observe the greatest care in digging the remainder of the ground, especially the spot whereon the house of Caxton the printer stood, where it has been supposed some relics of bygone times may be found.

Inventors and Steam in Siberia.—Letters from St. Petersburg state that a Polish exile has invented a means of applying steam-power to the traction of sledges, by which journeys may be rapidly made on the frozen rivers and in the steppes covered with frozen snow, which abound in the Russian dominions.

Victoria Provident Dispensaries.—At Leamington, in Warwickshire, a county meeting, called by the Lord Lieutenant, was lately held "to consider the best means of forming a Society for the Midland Counties in furtherance of the London Society for extending a knowledge of Royal Victoria or Self-supporting Dispensaries, and introducing them into those towns where the inhabitants will find the outfit, and the working people will unite and contribute proportionably for their support." Lord Leigh was called to the chair, and there were present Lord Willoughby de Broke; O. Pell, esq., High Sheriff; E. Greaves, esq.; M.P.; Mr. H. L. Smith, of Southam, the originator of the movement; and various other gentlemen. The meeting was addressed by the Lord Lieutenant, Leigh, and at considerable length by Mr. Smith in explanation. Mr. Townsend, son of a weaver of Coventry, urged the advantages of such institutions generally, and in particular referred to the one at Coventry. That dispensary, he said, had been established twenty-five years, and last year there were 4,500 members, whose contributions—a penny a week each for adults, and a halfpenny each for children—amounted to 749*l.* 3s. 6d. Of the contributors, 2,927 had received medical attendance and medicines during the past year, of whom 2,522 were cured, 244 relieved, 63 died, and 98 were left under treatment. As some of the benefits conferred on the poor by self-supporting dispensaries, he instanced the small amount (4s. 4d. per annum) at which medical aid was thereby secured to each individual; the amount of suffering which would be saved by at once resorting to a medical man on the first appearance of disease, as the indigent contributors would be enabled to do, without fear of incurring expense; and the composure of mind to the patient from the knowledge that he would not have to overtax his energies to pay a doctor's bill, or, in case of death, leave it to others to pay. Mr. Bicknell, one of the surgeons to the Coventry dispensary, bore testimony to the value of that institution to the poor, and stated that the system was beneficial rather than otherwise to the medical men. Two-thirds of the amount contributed by the poor went to pay the medical men, amongst whom it was equally divided, and the remaining third went in aid of the honorary fund, to pay the establishment expenses. The meeting passed various resolutions, originative of a Victoria Self-supporting Dispensary, in commemoration of her Majesty's visit to Warwickshire, and a committee was formed to procure subscriptions, &c.

Ely Cathedral and King's School.—Monday, the 26th ult. was observed as a day of festivity at the King's School, Ely, on the occasion of the opening for Divine worship of Prior Crauden's Chapel, within the cathedral precincts, which the dean and chapter, on the petition of the boys, have recently assigned to the school. Until the appointment of the present dean, the chapel was used as bed-rooms by one of the canons, its sculpture being barbarously disfigured to admit of a staircase, chimneys, floor, and partitions. Much remains to be done in the way of restoration—an object which the dean and chapter are desirous of effecting as soon as possible. The internal fittings are also far from complete. If any members of the Church should be disposed to assist the boys in completing the fittings of this interesting chapel, their contributions would be gladly received by the præfects of the school.

House Flies: a Sanitary Hint.—These troublesome summer visitors are not without their use, for they serve to indicate certain impure conditions which require care: it may be, that they also have the effect, to some extent, of purifying the atmosphere. Where flies abound, it shows to a certainty that there is something which should be removed. When visiting the dwellings of the poor, great difference in the number of flies in some rooms, in comparison with others, may be noticed, and it will be found that those apartments which are most dirty and neglected have the greater number of flies. At this season of the year all dust and refuse should be kept carefully covered and closed, both for the purpose of preventing an escape of effluvia, and preventing the mixture of moisture, which causes fermentation. In houses of the better kind, if flies are troublesome, a careful inspection of the neighbourhood would show some offensive refuse of stables and cow-sheds close by; and in cases where this cannot be obviated, extra care should be taken to wash all areas and use extraordinary cleanliness; and it would not be amiss if those who have charge of children were to descend to the lower regions for the purpose of sanitary inspection. Instead of catching the flies, remove the cause of their presence.

Monumental.—The monument to Mr. Frank Crossly, M.P. who gave the Halifax people their park, is to be a standing figure in marble, executed by Mr. Durham.——A freestone erection is about to be put up against the wall at the head of the grave of the late Hugh Miller, the geological and learned quarryman, author, and newspaper editor. It will have inserted in it a tablet of polished Peterhead granite, resembling the tablet erected at the grave of Dr. Chalmers in the immediate vicinity.——The *Scotsman* announces the opening of a subscription for a monument to James Hogg, the Ettrick Shepherd, to be erected in the romantic vale of Ettrick.——The Brotherton memorial in Peel-park, Salford, was to be inaugurated on the 5th inst. by the Bishop of Manchester. The appendage "Esq." to his name, which was intended to be inscribed on it, has with good taste been omitted.——The Empress Josephine's bronze statue, 10 feet high, to be erected by her grandson's orders, at St. Martinque, her native town, has arrived at Havre, *en route* for its destination. ——The memory of the late Mr. Richard Cutting has been perpetuated by a monument, which has during the last week been placed over his grave in the churchyard of Leek. The monument, which is in the Decorated style, has been erected from the designs of Mr. Sugden, architect, of Leek. It is about 20 feet high, and in three stages. On the stepped and moulded base, 5 feet square, rests a panelled dado, ornamented with diaper work, and the panels bear the inscriptions. Above this is a recessed and buttressed set-off, surmounted by arcaded and carved canopies, with clustered columns, and cusped and enriched panels and arches, and flanked by buttresses with carved pinnacles. From the canopies rises an octagonal spire, enriched with carved crochets and finial, and terminated by a gilded vane bearing the initial letter C. The whole has been executed in Burnley stone, and will be surrounded by a low iron railing. The work has been performed by Mr. Matthew Barlow, of Leek, who was assisted in the carving by Mr. Williams, of Manchester.

Piggeries and Disease in Towns: Diphtheria. —At an inquest, held on the body of a child that had died in a court in Aston-road, Birmingham, of an ulcerated throat, Mr. Keyworth, surgeon, gave it as his opinion that the disease was caused by the exhalation from putrid animal matter from pigs and piggeries, of which there are a great number in the court in question. No fewer than seven children, it appears, have died in the same neighbourhood since the 18th of June, and their disorder presented similar symptoms to those of the child upon which the inquest was held. This must be the dreaded diphtheria, or Boulogne sore throat, about which (as we see from the *Lancet*) doctors differ, as usual, very much; some even maintaining that it has not yet reached this country at all. In France it has been attributed to cesspool and sewer emanations. The peculiarity of it is said to consist in a fungus or mould which sloughs over the throat and fauces. It is surprising that essential oils, such as oil of cloves, which kill such vegetable moulds, do not seem to be thought of as a highly probable cure for this still incurable disease. That a most malignant species of sore throat exists in London, the writer of this has reason to know; and, moreover, that it appears to be infectious. There seems good ground to believe that essential oils would be beneficial both as a cure and a preventive.

Smoke-Consuming Fires. — Amongst those who have been striving for some time to effect such an arrangement of ordinary house fires as may serve to produce a consumption of the smoke produced, is Mr. Leighton, sen. of Brewer-street. His contrivance consists of a chamber at the back and sides of the fire, for making coke and giving support to the fire, by passing the gas and bituminous vapours into it, and in such proportions that the coals shall fuse and give out a sufficient quantity without excess: thus in general terms the coals of to-day will form coke for to-morrow. Mr. Leighton says, "If coals are cooked at the top of a fire, the gas and vapours fly off; if under, the draught is shut off, and consequently the means of cheering the fire is lost: if the fire is fed from the back and sides, you may still retain the grating under the quick fire, according to old usage. There are other minor advantages, as the light and warmth downwards, the lasting warmth, &c.; also the probability of being left longer than any other without being extinguished. An old stove could be modified for the purpose, by any moderately skilled workman."

The Atlantic Cable. — Information has arrived that the cable has been safely laid between Valentia, in Ireland, and St. John's, Newfoundland; in other words, that the work is done.

The Embassy-house in Paris.—Some correspondence referring to the vote of 19,269*l.* recently proposed for the expenses of the English Embassy-house in Paris, was yesterday given to the public by order of the House of Commons. The (then) Lords of the Treasury, on the 17th of July, 1857, intimated to Mr. Hammond that they thought 20,000*l.* to be an excessive charge for the "repairs" of a house, how large soever, and they ordered the Earl of Clarendon to take measures for the survey of the house by a French builder, who was to make his own estimate. The estimate of Mr. Henry A. Hunt, of the Office of Works, was 18,000*l.* exclusive of the new chapel. M. Raveaux, architect to the city of Paris, on being consulted, sent in a report to the effect that for 12,000*l.* the Embassy-house might be "completed and repaired in a fitting manner." This was handed over to Mr. Hunt, for his "observations." He appeared at first to doubt the accuracy of M. Raveaux's calculations, expressing an opinion that 12,000*l.* was insufficient to render the house "a fit residence for the ambassador." A more detailed report and estimate from the French architect, however, recently supplied at the request of the Government, fixed the total expenditure at 19,295*l.* and the accuracy of this sum Mr. Hunt saw no reason to doubt, although he says that M. Raveaux made a larger allowance than himself for decorative works, while he omitted some necessary structural improvements. It was determined by the Lords of the Treasury, on the 8th ult., at the request of Lord Cowley, to complete the works of the embassy without interruption, and an estimate for the whole amount was accordingly submitted to Parliament.

Proposed New Town-hall, Bridgwater.—At a meeting held on Tuesday last, at the Town-hall, plans for the proposed New Town-hall and Public Rooms, were presented. According to the *Bridgwater Times*, "Mr. Knowles's plans were, one for the alteration of the present Town-hall into a large public room (estimate 1,500*l.*), and another for the alteration of the Market-place into a reading room (estimate 500*l.*). The one plan shown by Mr. Paull, for the alteration of the Town-hall, gave the estimate at 1,200*l.* We believe that we are correct in saying that the plans exhibited by Mr. Knowles were generally approved of."

The Artesian Well at New Swindon.—Since our former notice of this undertaking, the labour of sinking the larger well has progressed satisfactorily, although somewhat slowly, in consequence of the continual flowing of the water. A powerful lift-pump at the mouth of the well is kept going day and night by four men, and by its agency about ten gallons of water every minute are drawn from the well; but on several occasions the rush of water has been so great as to suspend all excavation. The large well has now been excavated to the depth of 45 feet, through one solid bed of clay. This bed of clay extends to the depth of 60 feet from the surface or mouth of the well. A layer of rock, 2 feet 6 inches thick, then follows. The first rock is succeeded by another bed of clay, 7 feet thick, and then again by a rock, 4 feet 6 inches thick; and from thence to the bottom of the boring, 141 feet from the surface, nothing but clay is met with.

Opening of the Jews' Infant New School.—The new school of this institution, which had recently been erected in Commercial-street, Spitalfields, was inaugurated on Friday in last week, in the presence of a large assemblage of the Jewish persuasion, under the presidency of the Earl of Carlisle. The new school is erected on the western side of Commercial-street, about midway between Shoreditch and Whitechapel, upon an eligible site, under a long lease from the Crown, and notwithstanding the great difficulty of obtaining open spaces in the heart of the metropolis, an ample playground, partly covered in, has been secured. The building is calculated to accommodate 500 children, with rooms, &c. all lofty and well ventilated. It is in the Italian style of architecture, from the design of Messrs. Tillott and Chamberlain, architects. The external facing is of light-coloured brick, relieved with stone quoins and dressings, and the summit is decorated with an ornamental balustrade. The expense of erecting the building will exceed 4,000*l.*

Elder-bushes on a Church.—Will some of your correspondents be good enough to give their advice as to eradicating, or otherwise destroying some elder-bushes of some twenty years' growth. They have been cut off repeatedly, and *twice picked out* as deep as could be got, and the joints well pointed up with cement, but are now growing luxuriantly, at least 50 feet from the ground.

J. B. D.

Gas.—At a recent meeting of the Romsey Gas Company it was resolved to reduce the price of gas 10d. 1,000 feet: it is now charged to consumers at 7s. 6d. per 1,000. A dividend of 5 per per cent. to shareholders was declared.——At the half-yearly meeting of the Gainsborough Gas Company, a dividend at the rate of 6 per cent. per annum was declared, and a considerable amount appropriated to the extension of their works.—— A Manchester gas consumer complains in the local *Courier* that the corporation should realise as it does, for public improvements in the town, a profit from the supply of gas of no less than 40,000*l.* a year; while at Liverpool the gas consumers obtain their gas for 3s. 9d. in place of 5s. per 1,000 cubic feet. And doubtless the Manchester gas consumers are entitled to a reduction of the price of their gas. But how would they like to pay 5s. with the consoling assurance that the 40,000*l.* a year of profit went into the private pockets of some gas company? We suspect the London gas consumers would very willingly exchange places with them, were they assured that the immense profits realized were expended on public improvements, in which they still had some interest, and were likely still to derive some benefit. For the local and public improvement of a town, the devotion of surplus profits arising from an article of such public and general use as gas appears to be a very fair arrangement, were the price not much in excess, compared with what a private company would charge. Indeed, were the price less, the profit would probably be still greater.

Navvies wanted for Melbourne.—One of the contractors of the Melbourne and Sandhurst Railway, in a letter to a relative, states, that all able-bodied labourers, and especially those accustomed to railway work, such as navvies, blacksmiths, masons, bricklayers, &c. &c will be in great request on account of the Victoria Railways. It is impossible to say what rates will require to be given, as the particular line must, in terms of the contract, be completed by the end of 1861, and the enormous sum of the tender, amounting to 3,356,937*l.* will of course principally be expended on wages.

Southampton School of Art.—At a meeting of the committee of this school, the annual report of the master (Mr. Baker), which was read, showed a steady increase in the number of the pupils, and a marked improvement in the works executed: 144 pupils had been instructed in the school at the Victoria-rooms, being an increase of twenty-six on the previous year: 470 pupils had been instructed at the public schools—namely, 250 in St. Mary's, 40 in St. Luke's, 120 in the Peninsular and Oriental Company's school, and 60 at the British School. A successful branch school had been opened at Romsey, with 41 in regular attendance. This school included, 655 pupils have been more or less instructed in drawing during the past year, and this chiefly from those classes who would not have been taught drawing but for this school.

Royal Italian Opera-house. — There is nothing more remarkable in the proceedings at the new Opera-house than the large quantity of fine scenery which has been produced for the various operas brought forward in a comparatively short space of time. Had not Mr. Gye called in to his aid Messrs. Grieve and Telbin with their staff, in addition to Mr. Beverley and his staff, it could not possibly have been done. For "Don Giovanni" some very brilliant scenes have been painted, especially the statue scene, though the horse is a little deformed. Every lover of fine singing should hear this opera as at present cast. The season is nearly at an end, and we sincerely hope the result has been such as to reward properly the energy and perseverance of the lessee.

Uniting Metals.—As an improvement upon the existing mode of joining metals, Mr. A. Parkes, of Birmingham, proposes that zinc, or zinc and mercury, should be used, instead of the ordinary solders. The zinc may be used in strips, with a flux placed between the edges or surfaces of the metal to be joined, or the zinc or zinc and mercury may be used in a granular state with a flux. The surfaces are heated with gas or otherwise until the zinc or zinc amalgam flows, when the surfaces are subjected to a higher heat for a short time, by which process the joining will then be accomplished.

Chinese and Indian Road Material in Middlesex.—The first mile of roadway from Shoreditch to Stoke Newington has been kept in substantial repair with what is termed the "best of road materials," the black porphyry stones from China, brought to England as ballast in the tea ships, and the next half mile has recently been repaved with broken granite from Bombay.

Soane.—A correspondent of the *Literary Gazette* writes,—"I overlooked until to-day a query which I am able to answer. The querist is 'An Architect,' who desires to learn the authorship of an 'Ode to Dulwich College,' in which Sir John Soane is satirised. There is rather a curious history connected with the composition, which was written by Mr. Charles Knight, and published in his *European Magazine* in 1824. At that time there lived an architect named Stedman Whitwell, who possessed great talent as an architect, though his prospects were clouded by an unfortunate event. He was the architect of the Brunswick Theatre, which fell down after it had been opened three or four nights, burying many persons in its ruins. It was proved upon the inquest that, against his remonstrance, the carpenters' shops were hung up to the roof, and hence the catastrophe. He never again could command professional employment, and he died a disappointed man, though well known in the scientific world for his various acquirements. He was a severe critic of his professional brethren, and his notebook was filled with materials for a pamphlet on 'Architectural Absurdities.' At that time Sir John Soane was employed upon most public works. Whitwell had a profound contempt for his style, and had made a large catalogue of his faults. An article, of which Mr. Whitwell furnished the facts, and Mr. Knight the arguments, appeared in the magazine, and the Ode referred to was appended as a tailpiece to the criticisms. Soane was silly enough to bring an action against Mr. Knight for libel. The case excited a great deal of notice, for it involved the great question whether criticism on art and literature, even when avowedly satirical, was libellous. Soane had five counsel, of whom Brougham was one. Mr. Knight was fortunate enough to secure Scarlett, who convulsed the Court with laughter by reading portions of the verses, especially those which touched upon the new law courts, just then opened. The poor defendant was triumphantly saved from the heavy damages which the great architect demanded for his wounded reputation."

The Stage-coach a recent Novelty in Orkney.—The stage which has been driven from the south by the railway, has only just appeared in Orkney. For the first time, as we learn from the *John o'Groat Journal*, a coach has just rolled over the streets of Kirkwall. The formation of roads has led to this public conveyance. Captain Burt mentions that when the roads were made in the Highlands, about 1730, the people ran from their huts close to any coach that passed, looking up and bowing to the coachman, little regarding those who were inside. They looked upon the coachman as a kind of Prime Minister with the reins of Government in his hands.

Australian Strikes.—In the *South Australian Register*, of May 6, published in Adelaide, we find the following public notice:—"Wanted to be made known, that the mechanics of the Burra Mine will strike for wages on the 8th of this month, in consequence of their wages having been lowered 1s. per day.—Mechanics take notice."

Southampton Docks.—A recent report of the dock superintendent says,—The ground behind the north ward of the inner dock began to sink this morning, and the floor of the dock to rise. The movement has carried the whole forward for 250 feet, the extreme point being 4 feet 6 inches beyond the straight line. The whole has sunk 2 feet 6 inches, and the ground behind 10 feet. The bottom of the dock is raised 4 feet to 5 feet. The warehouse and vault are considered safe, the latter containing a valuable stock of wine in bottle, value 10,000*l*. The engineer estimates the cost of repairs will be from 2,000*l*. to 3,000*l*.

Public Works in Ireland.—A blue-book of eighty pages contains the twenty-sixth report of the Board of Public Works in Ireland. The total amount of sanctions up to the end of last year appears to have been 10,746,838*l*. and the issues 9,834,413*l*. The total repayments to the Exchequer, up to the 31st of December last, were 3,061,972*l*. The details of various public works in progress fill the bulk of the volume. Kingstown harbour works will be entirely finished by October. The general works there have been maintained as usual, and the sea-slopes strengthened.

Bedminster New Church, near Bristol.—We have received some (what we hope may prove) exaggerated particulars of the fall of a portion of this building, consisting of about 20 feet of the parapet of south aisle, at the west end, carrying away with it the lead gutter, and in its fall injuring the buttresses under. It appears to have been put up with cast-iron cramps, bedded in cement.

Consumption Hospital, Victoria-park.—The foundation stone of a new chapel, now in course of erection in the grounds of the City of London Hospital for Diseases of the Chest, in Victoria-park, was laid last week. The chapel is being erected at the private cost of an unknown friend to the Institution.

The Vacant Ground in Cheapside.—The City Lands Committee of the corporation of London, in conjunction with the Postmaster-General, have sealed an agreement with Messrs. Faudel and Co. of Newgate-street, for the entire plot of ground at the top of Cheapside for eighty years. Ground-rent, 610*l*. per annum.

Brick-making Machine.—At the Royal Agricultural Society's Chester meeting, a brick-making machine by Mr. Chamberlain, professing to turn out some 15,000 daily, was exhibited. It consists of a revolving horizontal circular disc, in which, arranged near to one another as dies in its surface, are eight brick moulds, with movable bottoms, traversing the moulds as pistons. This disc passes in one part of its course under a pugging mill, and the bottom of each mould being then at its full depth, it is filled with tempered clay. No sooner does it escape on the other side of this pugging hopper, than the bottom gradually rises, pushing up the brick, until before it reaches the store of clay again, it has risen its full height, and the brick, there passing the hands of the attendant, is lifted off, and taken away to the drying-ground. The bottom then falls again, and the mould is filled as it passes under the clay. The rising and falling of the sliding piston are provided for by a gradually-inclined plane upon a horizontal plane immediately beneath the revolving table, which, acting as a cam, pushes up and down the piston rod descending from each of them. The disc revolves once in about a quarter of a minute, and thus 30 bricks or thereabouts are turned out each minute.

Aluminium.—It has been proposed by M. Corbelli, of Florence, to obtain aluminium by a simpler and more economical process than heretofore. The metal is first well washed and cleansed from extraneous matters. Then he takes 100 grammes of clay, dries it, dissolves it in six times its weight of sulphuric acid, or very strong muriatic acid, dries the clay again, and heats it in an earthen vessel to 450 or 500 degrees C.; after which he mixes with it 200 grammes of yellow prussiate of potash, which should be quite dry and pulverized. To this mixture he adds 150 grammes of common salt, and places the whole, when intimately mixed, in a crucible. He then heats them to a white heat, and after the mass is cool the aluminium will be found at the bottom of the crucible.

Villas at Merton.—Sir,—Having some considerable interest in the character and position of several reputable builders, may I inquire of you, how it happens that one firm tenders for a sum of 1,742*l*. and another for a sum of 1,187*l*.? Surely there must be some mistake when so great a difference exists in the calculations of respectable firms.—E. S.

[advertisement.]

Self-coiling Convoluted Shutters.—The utility of Revolving Shutters for closing windows and other openings is universally acknowledged; but the cost has hitherto prevented their general adoption. Messrs. CLARK and CO. of 15, Gate-street, Lincoln's-inn, have recently introduced a new Self-coiling Revolving Shutter, which, in addition to being one-half the expense, has the advantage of being remarkably simple, and consequently less liable to get out of order. All the complicated gearing apparatus is dispensed with: there are neither wheels, shafts, rollers, cords, nor weights, to become deranged.

The Patent Self-coiling Shutter is composed of laths in metal or wood, which are connected by bands, or strips of tempered steel, that form the connection between the laths, and also cause them to coil, or roll themselves up into a circular space, above, below, or on either side of the window: grooves are formed in which the ends of the laths slide, and when the shutters are closed, keep the springs straight: the springs also counterbalance the weight of the shutters, which are opened and closed with the greatest facility. We are disposed to think they will be largely used, both for shop-fronts and private houses. Much of the difficulty now often found in providing shutters for large bow windows may be obviated by their use, without extra cost.—*From the Builder, June 26th*, 1858.

## TENDERS.

For the Toxteth-park Workhouse. Mr. W. Culshaw, architect. Quantities supplied by Messrs. B. and D. Howorth:—

| | | | |
|---|---|---|---|
| W. Tyson | £24,114 | 0 | 0 |
| H. Yates | 21,577 | 0 | 0 |
| R. Wells | 21,382 | 0 | 0 |
| Holme and Nicol | 21,312 | 0 | 0 |
| R. Anderson | 21,266 | 0 | 0 |
| G. Rome | 21,198 | 0 | 0 |
| Jones and Jump | 21,140 | 0 | 0 |
| J. Burroughs | 21,042 | 0 | 0 |
| G. Thompson and Co. | 20,970 | 0 | 0 |
| Kilpin and Mongomery (accepted) | 20,216 | 0 | 0 |

For additions to the Wandsworth House of Correction. Messrs. Hill and Martin, architects:—

| | | | |
|---|---|---|---|
| Colls and Co. | £18,987 | 0 | 0 |
| Lavers | 18,898 | 0 | 0 |
| Hardwick | 17,535 | 0 | 0 |
| Trollope and Son | 17,500 | 0 | 0 |
| Smith | 17,440 | 0 | 0 |
| Webb | 17,432 | 0 | 0 |
| Winter | 17,405 | 0 | 0 |
| Mixon | 17,400 | 0 | 0 |
| Myers | 17,150 | 0 | 0 |
| Nicholson | 16,675 | 0 | 0 |
| Adamson | 16,311 | 0 | 0 |
| Rowe | 15,972 | 0 | 0 |
| Moxon | 15,890 | 0 | 0 |
| M'Lennon and Bird | 15,572 | 0 | 0 |
| Reeves | 15,500 | 0 | 0 |
| Stiff and Richardson | 15,400 | 0 | 0 |
| Downs (accepted) | 15,360 | 0 | 0 |

For building four houses at Forest-hill, Sydenham, Kent, for Mr. H. B. Turnbull. Mr. W. Hey, architect:—

| | | | |
|---|---|---|---|
| Gammon | £3,353 | 0 | 0 |
| Downs | 3,296 | 0 | 0 |
| Tarrant | 3,200 | 0 | 0 |
| Matthews | 3,010 | 0 | 0 |
| Beckit | 2,849 | 0 | 0 |
| Powley | 2,590 | 0 | 0 |

For Congregational Church, Victoria-road, Newport, Monmouthshire. Mr. A. O. Watkins, architect:—

| | | | |
|---|---|---|---|
| Robbins, Newport | £3,230 | 0 | 0 |
| Griffiths, Newport | 3,040 | 0 | 0 |
| Moore, Newport | 3,025 | 0 | 0 |
| Lockier | 3,009 | 0 | 0 |
| Williams, Newport | 2,850 | 0 | 0 |
| Bolt, Newport | 2,813 | 0 | 0 |
| Cowlin, Bristol | 2,803 | 0 | 0 |
| Jackson, Monmouth (accepted) | 2,584 | 0 | 0 |

For enlarging the "New Christian Church," Argyle-square, King's-cross. Mr. B. A. C. Herring, architect. Quantities supplied by Mr. J. A. Bunker:—

| | | | |
|---|---|---|---|
| Turner and Sons | £2,577 | 0 | 0 |
| I'Anson | 2,435 | 0 | 0 |
| Macey | 2,396 | 0 | 0 |
| Brown and Robinson | 2,390 | 0 | 0 |
| Dove | 1,997 | 0 | 0 |

For additional building to workhouse, St. George-the-Martyr, Southwark. Mr. James Marsland, architect:—

| | | | |
|---|---|---|---|
| Keats and Moor | £2,398 | 0 | 0 |
| Roper | 2,395 | 0 | 0 |
| Hill | 2,317 | 0 | 0 |
| Rider | 2,310 | 0 | 0 |
| Marsland | 2,296 | 0 | 0 |
| M'Lennon and Bird | 2,094 | 0 | 0 |
| Cook | 2,288 | 0 | 0 |
| Pickford | 2,279 | 0 | 0 |
| Crawley | 2,250 | 0 | 0 |
| Thompson | 2,044 | 0 | 0 |
| Perry | 2,025 | 0 | 0 |
| Mares | 1,935 | 0 | 0 |
| Moxon | 1,911 | 0 | 0 |
| Downs (accepted) | 1,796 | 0 | 0 |

For building three houses, Stonecutter-street, Farringdon-market, for Mr. Thellussen and Mrs. Theobald. Mr. Meaken, architect:—

| | | | |
|---|---|---|---|
| Axford and Co. | £1,680 | 0 | 0 |
| Downes | 1,630 | 0 | 0 |
| Chapman and Parsons | 1,590 | 0 | 0 |
| Patient | 1,455 | 0 | 0 |

For two houses at Talfourd-road, Camberwell, for Messrs. Wilson. Mr. Bremman, architect:—

| | | | |
|---|---|---|---|
| Crawley | £1,678 | 0 | 0 |
| Henshaw | 1,620 | 0 | 0 |
| Colls and Co. | 1,588 | 0 | 0 |
| Wardle and Baker | 1,523 | 0 | 0 |
| Fisher | 1,467 | 0 | 0 |
| Thompson | 1,463 | 0 | 0 |
| Cook | 1,382 | 0 | 0 |
| Wells | 1,380 | 0 | 0 |
| Tarn | 1,311 | 0 | 0 |
| Thornhill | 1,131 | 0 | 0 |

For building the National School (exclusive of fittings) at Bishop's Sutton, near Alresford. Mr. Vernon W. Arnold, architect:—

| | | | |
|---|---|---|---|
| Loe | £583 | 0 | 0 |
| Caley and Boardman | 565 | 0 | 0 |
| Hall | 541 | 2 | 0 |
| Gover | 537 | 0 | 0 |
| Cooper | 535 | 0 | 0 |

For house at Twickenham, for Mr. E. Minister. Mr. W. White, architect. Quantities supplied by Mr. Field:—

| | | | |
|---|---|---|---|
| Houghton, Richmond | £1,125 | 15 | 0 |
| Nicholson & Sons, Wandsworth | 1,087 | 0 | 0 |
| Dawson and Son, Fulham | 1,035 | 0 | 0 |

For alterations and repairs at 5, Bloomsbury-square:—

| | | | |
|---|---|---|---|
| Kebbell | £438 | 0 | 0 |
| Cheeseman | 406 | 0 | 0 |
| Maeers | 405 | 0 | 0 |
| Walton | 398 | 0 | 0 |
| Perry | 395 | 0 | 0 |
| Case | 337 | 0 | 0 |

For repairs, &c. at Gower-street Chapel:—

| | | | |
|---|---|---|---|
| Clark | £322 | 5 | 0 |
| Walton | 285 | 0 | 0 |
| Bennett | 239 | 5 | 0 |
| Williams | 235 | 10 | 0 |
| Hammond | 217 | 16 | 8 |

For stables, &c. at Long-cross, Surrey. Mr. T. C. Clarke, architect:—

| | | | |
|---|---|---|---|
| Oades and Son | £282 | 0 | 0 |
| Noble | 260 | 0 | 0 |

For lodge, entrance-gates, &c. at Hoebridge, Surrey. Mr. T. C. Clarke, architect. Quantities not supplied:—

| | |
|---|---|
| M. and T. Smith | £272 1 6 |
| Oades and Son | 245 15 0 |
| Loe and Sons | 240 18 0 |

For alterations and additions at Messrs. Garrard's, Haymarket. Mr. C. Mayhew, architect. Quantities supplied by Mr. T. Nicholls:—

| | Re-building No. 25, Haymarket. | Total, with other Works. |
|---|---|---|
| Lucas, Brothers | £2,438 0 0 | £2,916 0 0 |
| Holland | 2,397 0 0 | 2,852 0 0 |
| Kelk | 2,460 0 0 | 2,847 0 0 |
| Mansfield | 2,235 0 0 | 2,780 0 0 |
| Nicholson and Sons | 2,268 0 0 | 2,750 0 0 |
| Haward | 2,258 0 0 | 2,695 0 0 |
| Cubitt and Co. | 2,075 0 0 | 2,490 0 0 |

For erecting stabling in Brunswick-street, Blackwall, for the London General Omnibus Company. Mr. Scurry, architect:—

| | | Old Materials. |
|---|---|---|
| Hill | £718 17 0 | £20 0 0 |
| Walker and Neave | 633 0 0 | 20 0 0 |
| Hooper and Son | 599 15 0 | 10 0 0 |
| Richards | 597 0 0 | 15 0 0 |
| Warner | 575 19 8 | 8 0 0 |
| Watts | 560 0 0 | 18 0 0 |
| Cave | 560 0 0 | 10 0 0 |
| Greig | 557 0 0 | 10 0 0 |
| Woods | 547 0 0 | — |
| Hack and Son | 547 0 0 | 7 0 0 |
| Raby | 547 0 0 | 12 0 0 |
| Woodruff | 500 0 0 | 5 0 0 |
| G. Todd, jun. (accepted) | 494 0 0 | 7 0 0 |

Delivered to the Harrow Local Board of Health for erecting sewage-tanks, filtering-beds, &c. to take up and re-lay 225 feet of 12-inch stoneware pipes; also 1,080 feet of 15-inch ditto, 400 feet of 12-inch ditto, 200 feet of 6-inch ditto, 90 feet of 9-inch ditto, with junctions, bends, manholes, &c. at Greenford-green and Greenhill, within the district of the said Board. Mr. William Smith, surveyor:—

| | Filtering Tanks, &c. | Sewers. |
|---|---|---|
| Kearley | £270 0 0 | £340 0 0 |
| Gibson | 161 0 0 | 276 0 0 |
| Pound | — | 246 0 0 |
| Houghton and Ley | — | 242 1 7 |
| Cole | 150 0 0 | 233 0 0 |
| Boulton (accepted) | 176 0 0 | 242 0 0 |
| Dowell | — | 225 0 0 |

## TO CORRESPONDENTS.

J. G. (thanks).—J. W. N.—G. G.—F. B. P.—S. I. M. R.—W. H.—W. P.—A.—H. R. J.—E. C.—W. F. S.—C. and E.—S. P.—Ely.—Chapuis (next week).—R. B. E.—D. W. R.—Constant Reader (the openings are deducted).—J. C.—E. S.—Young Architect.—E. S. T.—C. A.—Mr. P.—S. J. N.—J. H. G. (such an arrangement for ventilation was described some years ago in the *Builder*, and has been found effective).—W. H.—E. B. (we have no additional information).

"Books and Addresses."—We are forced to decline pointing out books or finding addresses.

☞ *NOTICE.—All Communications respecting Advertisements and Subscriptions should be addressed to "The Publisher of the Builder," No. 1, York-street, Covent-garden. All other Communications should be addressed to the "Editor," and* NOT *to the "Publisher."*

*Post-office Orders and Remittances should be made payable to Mr. Morris R. Coleman.*

## ADVERTISEMENTS.


ARCHITECTURAL JOTTINGS, NOTES of TRAVEL, ESSAYS, POEMS, REPORTS, and every description of LETTERPRESS and WOODCUT PRINTING, executed by Hand or Steam Power, by Messrs. COX & WYMAN, Printers of "The Builder," and numerous other Publications.

74 & 75, GREAT QUEEN-STREET, LINCOLN'S INN FIELDS, LONDON, W.C.

ABERDARE, GLAMORGANSHIRE.—SURVEYOR WANTED.—The Local Board of Health for the Parish of Aberdare are prepared to receive APPLICATIONS from CANDIDATES for the OFFICE of SURVEYOR for the above parish. He must be competent to prepare plans, drawings, estimates, and specifications of all works connected with the sewerage, paving, making, and repairing of the streets, as well as the surface-cleansing, and to superintend the execution thereof, test the materials, and see to the fulfilment of the conditions of the contracts for executing such works. He will also be required to report upon all new buildings within the parish, as to their drainage, levels, and other conveniences; and also upon cases of nuisances involving structural alterations for abating the same, and generally possess a thorough knowledge of all the duties required by the "Public Health Act, 1848." The whole of his time will be expected to be devoted to the service of the Board.—Persons desirous of undertaking the duties of such appointment, are requested to send in their application and testimonials, stating the amount of salary required, addressed to me, indorsed "Application for Surveyor," on or before MONDAY, the 6th day of SEPTEMBER next. The Board do not engage to accept the lowest or any offer.—By order of the Board, H. J. HOLLIER, Clerk.
Aberdare, July 27, 1858.

JOINER WANTED, who has been accustomed to jobbing.—Apply to Z. A. B. Mr. Coney's, 61, Wardour-street, Soho, W.

WANTED, in a BUILDER'S OFFICE, a respectable YOUTH accustomed to copying, squaring dimensions, &c.—Address, stating age, salary required, and where employed, to X. Y. 116, Grove-street, Camden-town, N.W.

TO BUILDERS' CLERKS.

WANTED, a young MAN, as BOOK-KEEPER and DRAUGHTSMAN, who thoroughly understands the routine of a builder's office.—Apply by letter, stating age and salary, to C. C. at the Office of "The Builder."

TO SURVEYORS AND OTHERS.

WANTED, a Good LEVEL and STAVES. Apply, by letter only, with full particulars, stating maker's name, lowest price, &c. to Mr. HART, 8, Great Queen-street, Westminster, S.W.

WANTED, an ENGAGEMENT, by a thoroughly-qualified MEASURER, DRAUGHTSMAN, and ACCOUNTANT, an experienced estimater, and practically acquainted with the management of work, at home or abroad. Age, 30. First-class testimonials.—Address, M.M. 9, Great Ormond-street, W.C.

WANTED, by a Young Man, a SITUATION as DRAUGHTSMAN in an ARCHITECT'S OFFICE. Salary moderate.—Address, F. W. 28, Sherrard-street, Regent-street.

WANTED, a RE-ENGAGEMENT, as SHOP or GENERAL FOREMAN. Two years' good character from last engagement.—Address, B. B. care of Mr. Barker, 45, Aldersgate-street, City, E.C.

TO ARCHITECTS AND BUILDERS.

WANTED, by the Advertiser, a SITUATION. He is a good draughtsman, of which specimens can be seen; can write, keep accounts, and book time well, and is now about leaving a builder. Very respectable references can be given from the place now leaving. Salary, 28s. per week.—Address, A. J. W. 19, Bedford-street, Gray's-inn.

WANTED, a RE-ENGAGEMENT, as FOREMAN of CARPENTERS, JOINERS, &c. either Shop or Out-door, having a good practical knowledge of all kinds of joiners' work, staircasing, &c. either in town or country. Age 35.—Address, A. A. Standard Coffee-house, 247, Euston-road, N.W.

TO ARCHITECTS.

WANTED, an ENGAGEMENT, in a Leading Office, by an experienced ASSISTANT, to prepare designs, working drawings, and specifications. Terms, Two-and-a-half Guineas weekly.—Address, Y. Z. Post-office, King William-street, E.C.

WANTED, a permanent SITUATION, by a practical ZINC-WORKER and PLUMBER, who has a knowledge of painting and metal japanning.—Address, H. M. D. No. 4, Raglan-cottages, Whipps-cross, Walthamstow, Essex.

TO LIME, TILE, CEMENT MERCHANTS, AND OTHERS.

WANTED, by a respectable Young Man, who is acquainted with the principal builders in and about London, a SITUATION, a few miles from London, as COLLECTOR, and to attend to a wharf. Has filled similar situations. Can be highly recommended from his present employers.—Address, M. R. C. Office of "The Builder."

TO IRONMONGERS, BUILDERS, GAS-FITTERS, AND OTHERS.

WANTED, by a middle-aged Man, a SITUATION as SMITH, BELL-HANGER, and GAS-FITTER. No objection to town or country.—Address, J. S. 52, Princess-road, Bermondsey.

WANTED, constant EMPLOYMENT, by a Young Man, as GRAINER and PAINTER. No objection to the country.—Address, X.Y. 30, Carlisle-street, Portman-market, N.W.

TO ARCHITECTS.

WANTED, a SITUATION, by the Advertiser. Is a superior and expeditious Draughtsman and Designer; well acquainted with all kinds of Perspective.—Address, B. L. 21, City-terrace, City-road.

TO ARCHITECTS, &c.

WANTED, an ENGAGEMENT as CLERK of WORKS. First-rate references given.—Address, Q. M. Office of "The Builder."

TO PLUMBERS AND OTHERS.

WANTED, a permanent SITUATION, as a THREE-BRANCH HAND, PLUMBER, PAINTER, and GLAZIER. Can do gas-fitting, if required. A good reference can be given.—Address, A. Y. 3, Claremont-place, opposite Albany-road, Old Kent-road.

TO BUILDERS, HOUSE-DECORATORS, &c.

WANTED, by the Advertiser, a SITUATION as CLERK. Has a thorough knowledge of Plumbing, Painting, &c.; also the measuring of work, Book-keeping, &c. Good references given.—Apply, by letter only, to K. L. 38, Charter-house-square, E.C.

TO BUILDERS AND ARCHITECTS.

WANTED, by a practical Man, a SITUATION as BUILDER'S FOREMAN, or CLERK of WORKS.—Address, A. F. G. at No. 4, York-terrace, King's-road, Chelsea, S.W.

TO ARCHITECTS AND BUILDERS.

WANTED, by a Young Man, a neat DRAUGHTSMAN, EVENING EMPLOYMENT in copying or tracing drawings, specifications to copy, &c. Terms moderate.—Address, B. N. 57, Frith-street, Soho, W.

WANTED, by a Young Man, a SITUATION as DRAUGHTSMAN in an engineer's office; has been used to the getting out of finished and working drawings, and the superintendence of workmen. Satisfactory references can be furnished.—Address, A. D. Post-office, Bath.

TO PLUMBERS, BUILDERS, AND OTHERS.

WANTED, by the Advertiser, a SITUATION as a good PLUMBER and GAS-FITTER, or a Three-branch hand. Good reference from last employer given if required.—Address, J. D. 5, Henrietta-street, Manchester-square, W.C.

TO MASTER SMITHS, GAS ENGINEERS, AND OTHERS.

WANTED, a SITUATION as FOREMAN, by a Person of steady, industrious habits, who is thoroughly competent in all branches of house smithing, gasfitting, bellhanging, and all kinds of hot-water work. No objection to go abroad.—For further particulars apply to G. C. at J. B. Sossen's, Ironmonger, Basingstoke, Hants.

TO MASTER BUILDERS, &c.

WANTED, by a Young Man, a SITUATION as PLUMBER. Can fill up his time with painting Country not objected to.—Address, L. T. 36, Cumberland-street, Marlborough-road, Chelsea, S.W.

TO MASTER PLUMBERS.

WANTED, to PLACE OUT, a LAD, aged 18. Has been at the trade four years.—Address, C. G. 5, Park-cottage, Forest-vale, Sydenham.

TO ENGINEERS, CONTRACTORS, &c.—A Gentleman, prevented by recent illness from following at present the active duties of his profession (that of a Civil Engineer), will be glad to UNDERTAKE, by commission or other satisfactory arrangement, any GENERAL WORK not requiring (at present) active exercise, as preparing plans, sections, or drawings, with the bills of quantities, estimates, &c. or other general office work. His practice has been more especially general railway engineering, and he has some experience also in building and other estimates.—Apply by letter, containing name and address, and stating generally the description of work required, to W. care of Messrs. Staunton, 9, West Strand, W.C.

THE Advertiser, at present disengaged, offers his services in the OFFICE of any BUILDING FIRM requiring assistance at a reasonable salary.—Address, A. C. 23, Little Russell-stree ,Bloomsbury.

TO PAINTERS, HOUSE-AGENTS, BUILDERS, &c.

THE Advertiser wishes for CONSTANT EMPLOYMENT, or Day-work, as PAINTER, GLAZIER, and PAPERHANGER. Can do plumbing, zinc-work, also the general repairs of houses in all branches. Good reference given.—Address, H. B. 3, George-street, Southampton-street, Camberwell, Surrey.

TO BUILDERS AND MASTER PLUMBERS.

THE Advertiser, a Young Man, is in want of a PERMANENT SITUATION, as PLUMBER and GLAZIER, in town or country. Can have undeniable reference as to abilities and general character.—Address, W. H. 34, Brindley-street, Harrow-road, Paddington.

TO ARCHITECTS AND OTHERS REQUIRING A THOROUGHLY PRACTICAL ASSISTANT.

THE Advertiser is a first-rate Draughtsman, well versed in all constructive details, having had the management of a large Builder's Yard, and the purchase of all material. Has had great practice in taking out quantities, measuring up works, surveying, levelling, &c. Testimonials from eminent architects and builders.—Address, Mr. ALEXANDER, 13, Palmerston-terrace, Camberwell, S.

TO ARCHITECTS.

OCCASIONAL ASSISTANCE OFFERED in TAKING OFF QUANTITIES, measuring up works, abstracting, billing, &c. upon moderate terms (to be agreed on), by a Gentleman of twenty years' experience in the building profession. Country business not objected to.—Address, A. B. Office of "The Builder."

TO BUILDERS, PAINTERS, GAS-FITTERS, &c.

BOOKKEEPER.—An experienced Builder's Clerk and Bookkeeper, with a good knowledge of general repairs, is desirous of an ENGAGEMENT (permanent, short, or otherwise), in making up arrear or current accounts, contract and extras, measuring and estimating, &c. in all branches of the trade, on most reasonable terms. Town or suburbs.—Address, BOOKKEEPER, 21, Phelp-street, Walworth, S.

TO ARCHITECTS AND SURVEYORS.

AN ASSISTANT, of considerable practical experience, a good draughtsman, and thoroughly versed in levelling, land-surveying, superintending works, and office routine, wishes a RE-ENGAGEMENT in an Architect and Surveyor's Office, in Town or Country. Salary not of primary importance.—Address, A. F. J. care of R. Evans, esq. 12, Barrett-grove, Stoke Newington, N.E.

A GENTLEMAN, aged 23, who has had considerable experience in first-class surveys, is open to an ENGAGEMENT. He is a neat and expeditious draughtsman. Terms moderate; excellent references.—Address, C. L. Post-office, Derby.

A DRAUGHTSMAN, accustomed to prepare Architectural and Engineering Drawings, is desirous of a RE-ENGAGEMENT as JUNIOR ASSISTANT in a good Office. Salary required, 25s. per week.—Address, E. 41, Barnard-street, Russell-square.

TO ARCHITECTS AND BUILDERS.

AN ARCHITECT, a Good Draughtsman, and expeditious Quantity Surveyor, thoroughly acquainted with details and construction, surveying dilapidations, and estimating, desires an ENGAGEMENT, either temporary or otherwise. Terms moderate.—Address, X. X. Y. Office of "The Builder."

TO BUILDERS, PAINTERS, &c.

AN ORNAMENTAL PAINTER, LETTER WRITER, and GRAINER—can work well at plain work if required—perfectly understands his business. Country not objected to. Audress, W. H. B. Office of "The Builder."

TO ARCHITECTS.

A GENTLEMAN, who has been eleven years in an Architect's Office in London, wishes for an ENGAGEMENT in its vicinity. Is a fair draughtsman, and understands the general routine of an office.—Address, A. B. O. Mr. Parnell's, 21, Upper King-street, Bloomsbury.

TO ENGINEERS, CONTRACTORS, BUILDERS, &c.

AN ASSISTANT ENGINEER, who has had considerable experience in the practical management of works, measuring, and getting out quantities, &c. is open to an ENGAGEMENT. Has no objection to go abroad for a few years.—Address, BETA, Post-office, Cardiff.

TO CIVIL ENGINEERS AND SURVEYORS.

AN ASSISTANT, experienced in Surveying and Levelling, and a good draughtsman, is open to an ENGAGEMENT. Has been engaged upon drainage and other public works of towns, and possesses good testimonials, or would give references.—Address, J. H. S. Post-office, Cardiff.

A CLERK of WORKS—a practical Man—competent to prepare plans, elevations, and detail drawings, well versed in Gothic details and construction, is open for a RE-ENGAGEMENT as CLERK of WORKS, or General Foreman or General Superintendent on an estate. Unexceptionable references.—Address, A. Z. 12, East-road, City-road, Hoxton.

TO BUILDERS.

A PRACTICAL CARPENTER and JOINER wishes for a RE-ENGAGEMENT as SHOP or GENERAL FOREMAN. Can be well recommended.—Address, T. S. 102a, Tachbrook-street, Pimlico, S.W.

TO OWNERS OF HOUSE PROPERTY, BUILDERS, &c.

A MIDDLE-AGED MAN is desirous of a PERMANENT SITUATION. He is a good accountant, accustomed to square dimensions, measure works, &c.; also a good painter; apprenticed to a bricklayer, plasterer, &c. Has no objection to devote his time to either work, separately or conjointly.—Address, Y. Z. Mr. Tuke's, 27, Trafalgar-road, Greenwich.

TO SURVEYORS, ARCHITECTS, &c.

A YOUTH, aged 16, having a good knowledge of surveying, levelling, &c. and who can assist in drawing architectural and engineering plans, sections, and elevations, is desirous of an ENGAGEMENT. He is well acquainted with mathematics, and is willing to assist generally.—Address, J. J. E. Mr. Esquipant's, 346, Oxford-street, W.

TO BUILDERS AND PLUMBERS.

A YOUNG MAN, aged 28, is desirous of obtaining a SITUATION as a superior THREE-BRANCH HAND. Understands book-keeping and generally measuring up work. Excellent references can be given, and security if required.—Address, T. H. B. Post-office, Elstree, Herts.

TO ARCHITECTS AND SURVEYORS.

AN ASSISTANT, thoroughly acquainted with Gothic, with some knowledge of Classic,—a good perspective draughtsman, and fully competent to the ordinary duties of an office, desires an ENGAGEMENT. Salary, 35s. per week.—Address, C. D. Post-office, 104, Strand, W.C.

PARTNERSHIP.—The Advertisers, who have had great experience in contracting and building, are desirous of extending their business by entering into PARTNERSHIP with a person who has capital at his command.—Address, by letter only, to B. M. at Mr. Mabley's, 143, Strand, London.

PARTNERSHIP.—To ARCHITECTS and SURVEYORS.—Wanted, the SHARE of an ESTABLISHED PRACTICE, either in London or elsewhere. The Advertiser having chiefly directed his attention to Classic architecture, would be able to superintend that branch in an office where both Classic and Gothic are practised. Prior to final arrangements it would be necessary for him to remain in the office some stipulated time, in order to ascertain the actual amount of work done.—Address, stating full particulars, to D. F. No. 11, Cannon-street West, City.

TO ARCHITECTS AND SURVEYORS.

AN ASSISTANT, now in an eminent office in town, is desirous of a RE-ENGAGEMENT. He has been accustomed to the preparation of finished, detail, and perspective drawings. No objection to the country.—Address, Z. X. Y. Office of "The Builder."

A THOROUGHLY experienced CLERK of WORKS is open to a re-engagement. Good Testimonials from parties for whom he has been engaged on public works.—Address, by letter, S. No. 2, Anke-terrace, Somerset-place, Hoxton.

KELLY'S PRACTICAL BUILDERS' PRICE-BOOK; or, Safe Guide to the Valuation of all kinds of Artificers' Work; with the Modern Practice of Measuring, and an abstract of the New Building Act for regulating the Construction of Buildings. Revised and Corrected by New Calculations upon the present Value of Materials and Labour. Arranged by an Architect of eminence, assisted by several experienced Measuring Surveyors. Illustrated and exemplified by Steel Engravings and numerous Woodcuts. Royal 8vo. price 8s. neatly bound.

London: published by T. KELLY, Paternoster-row; SIMPKIN and MARSHALL; and may be had of all Booksellers.

Of whom may be had, New Editions in Quarto, of the following Practical Architectural Works:—

1. PETER NICHOLSON'S PRACTICAL CARPENTRY, JOINERY, and CABINET-MAKING, Revised by TREDGOLD: being a new and complete System of Lines, for the Use of Workmen; founded on Geometrical and Mechanical Principles. Ten parts at 3s. or in boards, 30s.; containing upwards of 120 Steel Plates, and numerous Woodcut Diagrams.

2. PETER NICHOLSON'S PRACTICAL MASONRY, BRICKLAYING, and PLASTERING (revised by TREDGOLD), both plain and ornamental; containing a new and complete System of Lines for Stone Cutting, for the Use of Workmen; the Formation of Mortars, Cements, Concrete, to which is added a variety of new designs for Mural Tablets, Tombs, Gravestones for Cemeteries, &c. &c; and a description of the various materials employed. Ten Parts at 3s. or in boards, 30s.; containing upwards of Ninety Steel Plates and Numerous Woodcuts.

3. TREDGOLD and NICHOLSON'S Theoretical and Practical Treatise on the FIVE ORDERS of ARCHITECTURE: containing plain and simple Rules for Drawing and Executing them in the purest style; including an historical Description of Gothic Architecture. Illustrated by upwards of One Hundred Steel Engravings, executed by Artists of first-rate talent, including numerous Diagrams, &c. Twelve parts at 3s.; or in boards, 36s.

4. DESIGNS for COTTAGE and VILLA ARCHITECTURE: containing Plans, Elevations, Sections, Perspective Views, and Details, for the Erection of Cottages and Villas. By S. H. BROOKS, Architect. Beautifully engraved on steel, with Direction for Building, and the estimated Cost of each Edifice. Twelve parts at 3s.; or in boards, 39s.

5. DESIGNS for PUBLIC BUILDINGS, consisting of Plans, Elevations, Sections, Perspective Views and Details of Churches, Chapels, Schools, Almshouses, Gas Works, Markets, and other buildings for public purposes. By S. H. BROOKS, Architect. Beautifully engraved on steel. Ten Parts, at 3s. or 32s. boards.

6. THE HOUSE DECORATOR and PAINTER'S GUIDE: containing a series of Designs for Decorating Apartments with taste, and suited to the various styles of Architecture. By H. W. and A. ARROWSMITH, House Decorators to her Majesty. Ten Parts, at 3s.; or in boards, 32s.

7. THE HOUSE PAINTER, or DECORATOR'S COMPANION: containing a complete Treatise on the Art of House Painting, Graining, and Marbling; including the Origin of Colour, the Laws of Harmonious Colouring, the Manufacture of Pigments, Oils, Varnishes, &c. By W. M. HIGGINS, Esq. Accompanied by actual Specimens of Hand-Brush Graining and Marbling. Ten Parts, at 3s.; or in boards, 32s.

THE ENGINEERS' and MECHANICS' ENCYCLOPÆDIA, a new and enlarged edition, comprehending Practical Illustrations of the Machinery and Processes employed in every description of Manufacture of the British Empire. Illustrated by upwards of 2,000 Wood Engravings. By LUKE HERBERT, Civil Engineer, &c. The rapid progress of Mechanical Science has developed many of the important facts since the first publication, in 1835, of the Encyclopedia. The Inventions and discoveries recently made have engaged the sedulous attention of the Editor; for, as the value of each was tested by experiment, a description was accordingly prepared. By the selection of new articles, and care in the revision of old ones, this edition has now become systematically enriched; so that it may be received as fully and faithfully expressing "the existing state of Engineering and Mechanism, adapted to the wants of Practical Men." In two large 8vo volumes, cloth lettered, price 30s.

Neatly Bound, price 4s.

A HANDBOOK of ARCHITECTURE for the UNLEARNED: in a Series of Letters to a Lady, embodying a Popular Sketch of the History of Architecture, and the Characteristics of the various Styles which have prevailed.
By GEORGE GODWIN, F.R.S. &c.
With Illustrations.

By the same Author, in 1 Vol. Handsomely Bound, 21s.

BUILDINGS and MONUMENTS, Modern and Mediæval; being Illustrations of the Edifices of the Nineteenth Century, and of some of the Architectural Works of the Middle Ages. With numerous Fine Engravings.

At the Office of "The Builder," 1, York-street, Covent-garden.

WANTED to PURCHASE, the following Numbers of "THE BUILDER":—595 to 621, both inclusive; 677, 682, 684, 687, 690, 625; 700 to 707, both inclusive; 713 to 723, both inclusive; 731, 732, 743, 753, and 754. Total, fifty-four numbers.—Address, H. WAYLAND, Bookseller, Royal Victoria Arcade, Ryde, Isle of Wight.

GALLERY of ELECTRO BRONZES, No. 391, Strand.—ADMISSION FREE.—ALTO RELIEVOS in Copper Bronze and in Gold and Silver, by the Galvano-Plastique Patent Process, at an UNPRECEDENTED PRICE, rendering them available for architectural and general decorative purposes, and forming extremely beautiful and novel acquisitions to the drawing-room, library, or picture-gallery, as Works of Fine Art. Battle, Scriptural, Emblematical, and other highly-interesting Pieces, in solid metal, having been exhibited several times at the Conversazioni of the Royal Institution and other leading institutions of London, are now on View to the Publicat the above Gallery, 391, Strand, from TEN till FOUR.—Catalogues, with every information relative to the extensive capabilities of the Art, may be obtained from the Secretary, at the Gallery, or from any of the Local Agents who are now being appointed throughout the country. H. CHALON, Secretary.

SURVEYING, LEVELLING, and CIVIL ENGINEERING.—PRACTICAL FIELD INSTRUCTION is given in Surveying, Levelling, Civil Engineering, &c. by Messrs. HYDE, SMITH, and LEWIS, Civil Engineers, Surveyors, &c. of extensive practice, who give Instruction in every branch of the Profession.—Terms for the Course of Three Months, Two Guineas. No extras.—For Prospectuses, &c. apply at the Offices, 24, Guildford-street.

ARCHITECTURAL and ENGINEERING DRAWING CLASSES, for Architects, Builders, and Engineers' Sons, Assistants, Clerks of Works, &c. Established by Messrs. HYDE, SMITH, and LEWIS, Architects, Civil Engineers, &c. for giving DAY and EVENING INSTRUCTION in Architectural, Engineering, and Mechanical Drawing; Perspective, Isometrical, and Geometrical Drawing; Making Finished and Working Drawings; Preparing Specifications, Taking out Quantities, Estimating Builders' Work, &c. Terms:—Day Pupils, Three Guineas per Quarter; Evening Pupils, One Guinea per Quarter. There are no extras: the Terms include the whole of the above, with the use of Drawing Boards, T-Squares, Plans, Drawings, Models, &c.—Prospectuses, and full particulars may be had at the Offices, 24, Guildford-street, Russell-square, London.

C. S. KELSEY, Figure and Architectural Sculptor and Modeller, 29, Clipstone-street, Fitzroy-square, W. having been engaged at St. George's-Hall, Liverpool, under the late H. L. Elmes and C. R. Cockerell, esq. R.A. and recently in the sculptured decoration of the Clothworkers'-Hall, London, under S. Angell, esq.; and also the Law Fire Office, Chancery-lane, under T. Bellamy and G. Pownall, esqrs. will be happy to EXECUTE any WORKS in FIGURE or ORNAMENTAL CARVING or MODELLING, either in town or country. The carved decorations of public buildings, &c. estimated for. Monumental works designed and executed in marble or stone. Designs and models furnished for silver or bronze castings.

TO ARCHITECTS, &c.

EXHIBITION and COMPETITION DRAWINGS prepared, and LITHOGRAPHY (the cheapest in London) executed, in all its branches, by Mr. T. J. RAWLINS, 38, University-street, London, W.C.

THEODOLITES, LEVELS, CIRCUMFERENTERS, MATHEMATICAL DRAWING INSTRUMENTS, SCALES, RULES, TAPES, T-SQUARES, &c. &c.—JOHN ARCHBUTT, 20, Westminster-bridge-road, Lambeth, near Astley's Theatre, respectfully calls attention to his stock of the above articles, manufactured by superior workmen. The prices will be found considerably lower than ever charged for articles of similar quality.—An illustrated price-list forwarded free on application.—8-inch dumpy level, complete, six guineas; 10-inch ditto, eight guineas; 14-inch ditto, ten guineas; with compass, one guinea each extra. Best 5-inch theodolite, divided on silver, eighteen guineas.

LAND TO BE LET at Kilburn, Norwood, Twickenham, Burgess-hill, Brighton, and Tottenham.—Advances made to respectable builders.—Apply to Mr. J. P. PATMAN, Architect and Surveyor, 31, Great James-street, Bedford-row.

ANCHOR and HOPE PUBLIC-HOUSE, Fore-street, in the City of London, and Nine Houses in Three Dagger-court, Fore-street.—The Court of Assistants of the Worshipful Company of Pewterers are willing to receive PROPOSALS for LETTING the above HOUSES, as and from the 25th of next DECEMBER, either together or separately, by lease or otherwise. Proposals to be sent under seal, to Mr. WILLIAM DADLEY, on or before the 17th day of AUGUST, 1858. The Company do not bind themselves to accept any Tender. WILLIAM DADLEY, Clerk to the Company.
1, Anchor-terrace, Bridge-street, Southwark, S.E.

CROWN LANDS, RICHMOND, SURREY. TO BE LET for BUILDING, by order of the Hon. Charles Gore, the Commissioner of Woods, Forests, &c. in charge of her Majesty's Land Revenue in England, the whole or part of MARSHGATE FARM, situate within a short distance of Kew Gardens and the railway station.—For further particulars apply to Mr. JOHN CLUTTON, 9, Whitehall-place, Westminster, S.W.

CROWN LANDS, HAINAULT, ESSEX. TO BE LET, for a term of years, from the 5th of JULY, 1858, by order of the Hon. CHARLES A. GORE, the Commissioner of Her Majesty's Woods, Forests, &c. in charge of Her Majesty's Land Revenues in England, a BRICK and TILE YARD, with the MACHINERY, PLANT, and BUILDINGS, about four miles from the Ilford and Romford stations on the Eastern Counties Railway. The tile yard is situated in a convenient position for carrying on an extensive trade, and the access is by good roads.—For further particulars, apply at the Office of Mr. JOHN CLUTTON, 9, Whitehall-place.

NORWOOD, within three minutes of the Station, to London-bridge and West-end.—GROUND TO BE LET, for building villas, from 50l. to 100l. per annum, which are in great request. There is not a house on the estate unlet, while numerous applications are daily made for residences. Private gentlemen requiring large plots, can secure them. Advances made.—Apply to W. F. LOW, Esq. Solicitor, 67, Wimpole-street, Cavendish-square.

TO BE SOLD, by PRIVATE CONTRACT, a most desirable FREEHOLD ESTATE, well adapted for building purposes, situate on Clapham-common, on the high road from Clapham to Wandsworth.—For particulars apply to JAMES CROWDY, Esq. 17, Serjeants'-inn, Fleet-street, E.C.

TO BUILDERS.—BELVEDERE, ERITH, KENT, the Seat of Sir Culling Eardley, Bart.—BUILDING GROUND TO BE LET, for ninety-nine years, with extensive choice of sites.—The estate is beautifully situate on the banks of the Thames, twelve miles from London by the North Kent Railway. A new station, to be called Belvedere Station, is in course of erection between Abbey Wood and Erith, abutting upon the estate. Bricks, lime, and sand may be obtained on the property, and money will be advanced to builders.—For further particulars apply to Messrs. W. G. and E. HABERSHON, Architects, 38, Bloomsbury-square, London. Mr. Stickland, Bailiff, on the Estate, will show the plans and sites.

TO BUILDERS and OTHERS.—Hargraue Park Estate, Upper Holloway.—The Trustees of this highly eligible FREEHOLD PROPERTY are prepared to entertain offers for the SALE or LEASE of BUILDING PLOTS on liberal terms. Houses built on adjacent property command both ready tenants and purchasers.—For particulars apply to R. L. ROUMIEU, Esq. 10, Lancaster-place, Strand; or to P. A. HANROTT, Esq. 36, Southampton-row, Russell-square.

WEST HAM, ESSEX.—TO BE LET, on building lease, for the term of ninety-nine years, either in one lot or in smaller plots, suitable for the erection of semi-detached villas, a most delightful and eligible piece of LAND, in the high road, from West Ham to Plaistow, containing four and a half acres, or thereabouts, situate within one hundred yards of the new Station, at Plaistow, on the Tilbury line, and about four miles from Fenchurch-street Terminus.—Two-thirds of the money will be advanced, and the new road and sewers will be constructed by the lessee, on easy terms. Full particulars may be obtained, and the plan exhibited, upon application to Mr. R. CARTER, Surveyor, 42, Fish-street-hill, London; and 1, Langthorne-place, Stratford.

WEST HAM, ESSEX.—To Manufacturers and Others requiring most eligible Plots of Land (large or small).—TO BE LET, on Building Leases for Ninety-nine Years, suitable for the erection of factories, mills, builder's premises, &c. with every facility of approach. This land is situated half a mile from Stratford-bridge and Plaistow Stations,—thus being in easy and rapid communication with the Fenchurch-street and Bishopsgate-street Termini.—For full particulars application to be made to Mr. R. CARTER, Architect, Surveyor, and Land Agent, 42, Fish-street-hill, London, and 1, Langthorne-place, Stratford.
N.B. A compact estate of Seven newly and well built Dwelling Houses, fit for occupation, to be Sold, for the term of ninety-seven years at a low ground-rent of 17l. 10s. Price 1,200l.

FULBRIDGE-WHARF, MALDON, ESSEX.—WATERSIDE PREMISES, comprising large Brick-built Granary, Stable, Sheds, and Cottage, doing a trade in English and Foreign Timber, Deals, &c. TO BE DISPOSED OF. The Proprietor about to remove to a distance.—Enquire of J. MESSER, Maldon.

IRON and BRASS FOUNDRY, Northampton.—TO BE SOLD by PRIVATE CONTRACT, or Let for a Term of Years, the Extensive PREMISES situated in Commercial-street, Northampton, formerly occupied by the Firm of Grundy and Co. Engineers, and Iron and Brass Founders, &c. and in which a successful trade has been carried on for many years. To any person with a moderate capital an advantageous opportunity is offered for entering into business, as there is no stock or fixtures to be taken. The important and increasing town of Northampton is situated in the centre of a wealthy agricultural district, and there is at the present time a most desirable opening for an extensive trade in agricultural machinery of every description. Melting iron can now be obtained from the Northamptonshire Furnaces in the neighbourhood.
*** The premises are equally eligible for any other manufacturing concern requiring room. Two-thirds of the purchase-money may remain on mortgage of the premises, if required.—Apply to Mr. GRUNDY, 9, Spencer-parade, Northampton.

The extensive Brick, Pottery, and Cement Works of the late Thomas Cubitt, esq. at Burham, on the Medway.

MESSRS. FULLER and HORSEY are instructed to negotiate the SALE, by PRIVATE CONTRACT, of the extensive BRICK, POTTERY, and CEMENT WORKS, formed by the late Thomas Cubitt, esq. within the last eight years. The Burham works and clay-fields occupy a site of about eighty-five acres, partly freehold and partly leasehold, on the banks of the River Medway, and free from Medway river dues. The distance from London is about thirty-eight miles, and the Snodland or Aylesford stations of the North Kent Line are within two miles of the property. The surface of the land slopes at an inclination of about 1 in 80 towards the river, and the pits having been formed near the summit, but little haulage is requisite. The clay is known as the Gault Clay, and it extends beneath the entire surface to a depth of about 130 feet, affording a supply more than sufficient for the next century. The Gault clay requires a smaller quantity of ashes than any clay near London, and the Burham works are nearer to the London markets than any other where the Gault clay is found. The cost of carriage to London is only 3s. 6d. for 1,000. The works were established by Mr. Cubitt for his own requirements exclusively, and both money and skill have been unsparingly expended for the purpose of rendering them complete. The principal building is upwards of 300 feet in length, chiefly three stories high. There are four pottery-kilns within the building, and also drying apparatus consisting of warm-water pipes. Outside the building, and conveniently placed, are three Suffolk kilns (two for 80,000 each and one for 30,000); two waggon-top kilns, 50,000 each; twelve Scotch kilns, 90,000 each; and three ditto of 60,000 each; also, seventeen acres covered hack ground, in capital order.
The plant is capable of producing 20,000,000 bricks per annum, in addition to an almost unlimited quantity of drain-pipes, tiles, and fancy goods of various kinds, and consists of seventeen brick and tile machines, Ainsley's rollers, with Mr. Cubitt's improvements, and the requisite pug-mills, worked by a pair of condensing steam engines, by Maudslay, Sons, and Field, of 220 horse power, with boilers, wrought iron main shaft, 330 feet in length, and gearing. There are upwards of 100 different sorts of dies for tubes, pipes, and fancy goods, hollow tiles, tubes, splay bricks, paving bricks, sole and flue tiles. Near the clay-pit are two large wash-mills, worked by two portable engines of 10-horse power, by Clayton and Shuttleworth, and connected by wooden troughs with four large malm backs, at the lower part of the field. A reservoir of three acres in surface has been formed, which is filled from the Medway every tide, and affords a sufficient supply of water for the engines, and the general purposes of the establishment. The works are intersected by upwards of two miles of iron railways, with turntables and weigh-bridge, and there is a most substantially-built wharf, with stone wall, having space of sufficient length for six barges to lie alongside.
The Cement Works comprise four well-built kilns for 60 yards each, three drying stoves, and nine coking ovens, wash-mill, pumps, and pipes worked by a portable steam-engine by Clayton and Shuttleworth. There is a separate wharf for the use of the cement works. On the works is a newly-erected residence for general manager, well placed, and surrounded by a large and productive garden. A newly erected house for foreman of cement works, three cottages, stabling, and a mess-room for the workmen, with cooking apparatus. At a short distance, on the opposite bank of the Medway, is a 12-acre field of excellent sand for brick-making purposes, and a wharf for landing it. As before stated, these works were established to supply Mr. Cubitt's own requirements, and therefore have not been brought into competition with other works of a similar character; but the facts that the Gault clay is acknowledged to be the best for brick-making purposes, that this field is the nearest yet in existence to the London market, that coals can be procured without being subject to City of London or lock dues, that all other raw materials can be obtained on the very best terms, that the machinery is of the highest character, most judiciously planned, and that for its working skilled labour is not required, all serve to show that a most profitable and extensive trade may be carried on in the manufacture of bricks, drain-pipes, tiles, and cement.
For further particulars apply to Messrs. FULLER and HORSEY, Billiter-street.

TO BE SOLD PRIVATELY, several PLOTS of FREEHOLD BUILDING LAND, in Eastdown Park, Lewisham, Kent. One 550 feet by 150 feet.—Apply to RICHARD GOODISON.

A NUMBER of SMALL HOUSES in CARCASS, or partly finished, TO BE LET, at ground-rents, on very favourable terms, with or without advances. They are certain to let as soon as complete.—Apply to Mr. JAS. EDMESTON, Architect, 5, Crown-court, Old Broad-street, E.C.

TO ARCHITECTS or BUILDERS.—The Patentee of an article extensively used in building, is desirous to arrange with an Architect, Builder, or Engineer in London for the PARTIAL USE of OFFICES during the advertiser's visit to town.—Address, V. P. care of Messrs. Joseph Thompson and Son, Booksellers, Market-street, Manchester.

CROWN LANDS, WHICHWOOD, OXON.—TO BE SOLD, a Quantity of HEWN and ROUND OAK TIMBER, principally of this year's fall, suitable for ship-building and other purposes. The timber is near to good roads and a railway station.—For particulars, apply to Mr. JOHN CLUTTON, 9, Whitehall-place, Westminster.

TO BE SOLD or LET, on Building Lease, a very eligible and valuable PLOT of LAND, containing about nine acres, in the parish of Stanwell, and only one mile and a half from the Ashford station, on the London and Staines Railway. The situation is open and very healthy, and the site, which is only three miles from Staines and six from Windsor, is admirably adapted for the erection of villa residences, which, from the convenience of access from London, would very readily let.—For particulars apply to Messrs. BEADEL, SON, and CHANCELLOR, Chelmsford, Essex.

TO BUILDERS and OTHERS.—TO BE LET, fine MANUFACTURING PREMISES, consisting of yard, 70 feet by 60, and workshop in rear, 45 feet by 25, with three stables. The goodwill, some tools and materials to be sold a bargain. Rent 50l.; also a house adjoining, if required, at 25l. a year, both free of taxes. Short or long lease of 80 years if required.—Address, Mr. LINDLEY, Agent, 19, Catherine-street, Strand.

ACCIDENTS of EVERY DESCRIPTION.
£1,000 IN CASE OF DEATH; OR
A FIXED ALLOWANCE OF 6l. PER WEEK
IN THE EVENT OF INJURY
May be secured by an Annual Payment of 3l. for a Policy in the RAILWAY PASSENGERS' ASSURANCE COMPANY.
A special Act provides that persons receiving compensation from this Company are not barred thereby from recovering full damages from the party causing the injury; an advantage NO OTHER COMPANY CAN OFFER.
It is found that ONE PERSON in every FIFTEEN is more or less injured by Accident yearly. This Company has already paid as compensation for Accidents 27,088l.
Forms of Proposal and Prospectuses may be had at the Company's Offices, and at all the principal Railway Stations, where, also, Railway Accidents alone may be insured against by the Journey or Year.
NO CHARGE FOR STAMP DUTY.
WILLIAM J. VIAN, Secretary.
Railway Passengers' Assurance Company,
Offices, 3, Old Broad-street, London, E.C.

TO BUILDERS, &c.

PLATE GLASS INSURANCE (Established 1852). Chief Offices, 52, Lime-street, London.—Every kind of fixed glass insured against breakage. Insurances effected during removal and alterations, or building of premises, &c. A liberal commission to builders, foremen, &c. for introduction of business. Active agents wanted. E. DRESSER ROGERS, Managing Director.

PEAKE'S TERRO-METALLIC TILES, PIPES, &c.—Notice is hereby most respectfully given, that the LONDON DEPOT for this Ware is REMOVED to No. 21 Wharf, Macclesfield-street North, City-road Basin, N. 2ndly, that the trade term, "TERRO-METALLIC" is the exclusive right of the Proprietor; and 3rdly, that the "Reports of the Juries," page 581, of the Great Exhibition, note the grant of a First-class Medal, and rank the Manufactories known so long as "The Tileries," Tunstall, Staffordshire, as the first of the kind in the world.